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ABSTRACT

This is one of a series of units for environmental education developed by the Highline Public Schools. This unit on water is designed for primary grades. Included are ten lessons. Each lesson includes the concepts of the lesson, materials needed, time for the activity, procedure, evaluative activities, and follow-up activities. Included are suggested films, books, and worksheets. Materials were tried and evaluated; evaluation data may be obtained from the Highline Public Schools. (RH)

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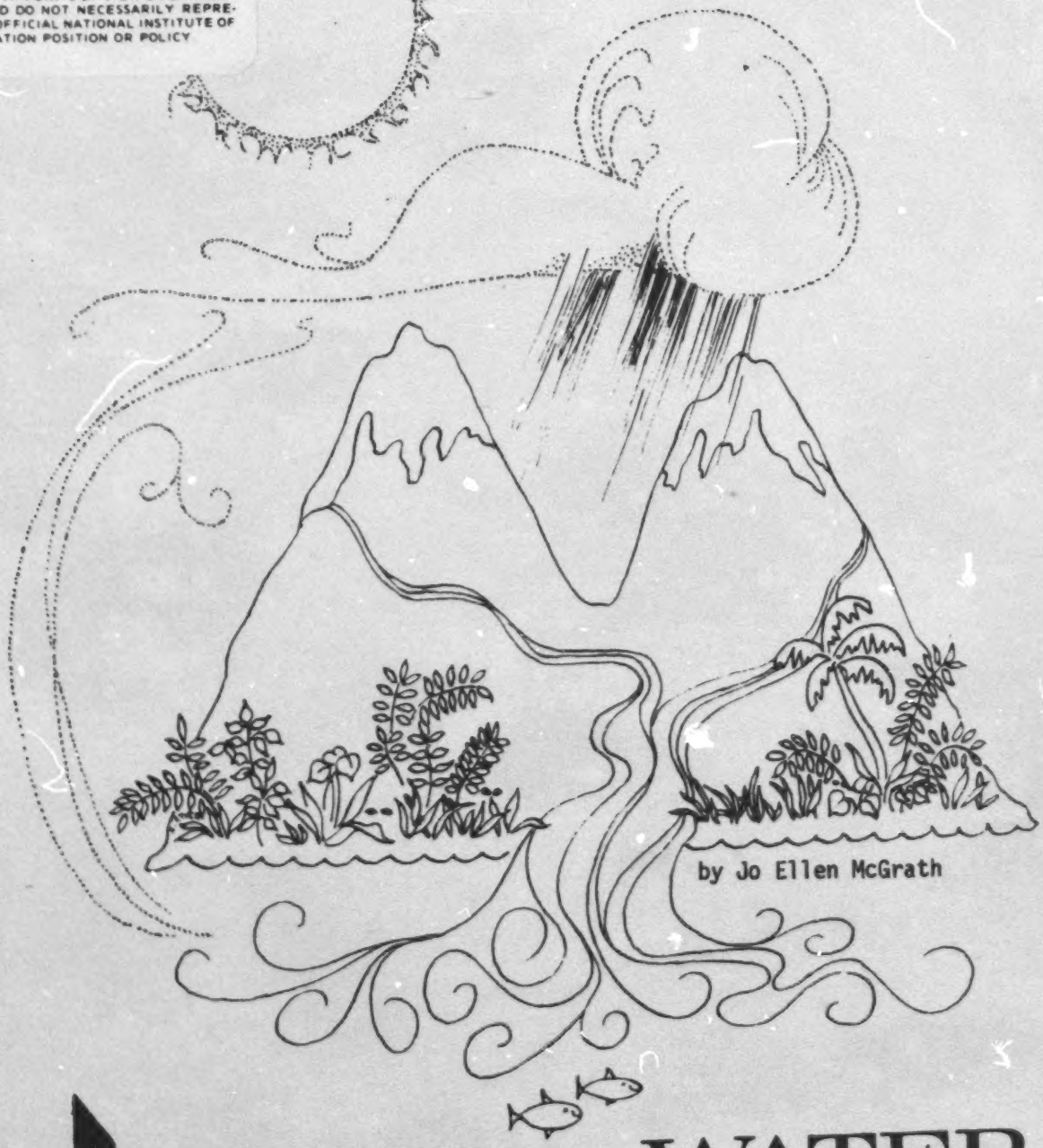


by Jo Ellen McGrath

WATER

An Environmental Learning Experience for use at the primary level. One of many ELE Paks available for all areas.

Project ECOLogy, ESEA Title III
Highline Public Schools
Department of Instruction
P. O. Box 66100
Seattle, WA 98166
Phone: (206) 433-2453

SE 021 441

NATURE KNOWS BEST

PROJECT ECOLOGY TITLE III

The Kids Who Participated in the Pilot Evaluation Program

Michael Flewelling	Scott Sullivan	Mick Holcombe
Steven Galando	Armond Swanson	Daniel Sleeth
Kevin Kennedy	Crystal Baisch	Ellen Buhl
David Kircher	Kelly Hand	Jennifer Cavanaugh
Michael Raub	Lisa Hillman	Michelle DeLaurenti
Eric Sowl	Jodi Lee	Cheryl Green
Kyle Sparks	Sally Kirsch	Kristie Hilson
Scott Stewart	Anthony Boston	Denise Paulus
Eric Strand	Bradley Butler	Dorothy Wheeler

The Readers Who Studied, Critiqued & Offered Suggestions & Ideas for Improvement

Mary McEachern, Salmon Creek Elementary, 2nd grade
Marilyn Mersereau, Bow Lake Elementary, 4th grade
Sam Mitchell, Federal Way School District

The Author/Teacher Who Developed This Environmental Learning Experience (ELE)

JoEllen McGrath	Highline School	Ray McClung
Sunnydale Elementary	District #401	Principal

Evaluation Results Regarding This ELE May Be Obtained by Including This Page and a Self Addressed Stamped Envelope To

Highline Public Schools, District 401
Instructional Division
Project ECOLogy ESEA Title III
Bill Guise, Director
15675 Ambaum Boulevard S. W.
Seattle, WA 98166

EVERYTHING IS CONNECTED TO EVERYTHING ELSE

PROJECT ECOLOGY

THERE IS NO SUCH THING AS A FREE LUNCH

PROJECT ECOLOGY TITLE III

EVERYTHING MUST GO SOME WHERE

PROJECT ECOLOGY • TITLE III

CONCEPTUAL OVERVIEW OF UNIT

1. Water is an integral part of our daily lives.
   All living organisms need and depend on water for survival.

2. Weather conditions are always changing.
   Water is very much a part of weather systems.
   Weather affects everyone's lives, and many people's jobs.

3. Water expands as it feeezes.
   Water requires a temperature of 32 degrees Fahrenheit or below in order to freeze.
   Water temperatures change slowly.
   Ice is the solid form of water.
   Frozen water has many uses - food, recreation.
   Cold weather changes our lives.
   Safety is important in the winter time.

4. Water is capable of dissolving certain substances.
   Water may look clean, but really be harmful to drink or use.
   Living things need clean water to live healthy lives.

5. Water is in the air.
   Water takes a gaseous state when it evaporates.
   Heat and wind affect evaporation.

6. Cooling causes water in the gaseous state to return to the liquid state.
   Substances dissolved in water do not evaporate with the water molecules.
   The water cycle involves mainly evaporation and condensation.
   Man is experimenting with ways to get fresh water from salt water.

7. Some living things require a complete water environment to survive.
   Water environment, as any environment, must be carefully taken care of to sustain its life.

8. Clean water is important to living things.
   Man's activities affect resources.
   Littering can cause pollution.

9. There is a limited supply of water for the whole world to use.
   Each person is responsible to help preserve that supply of clean water and not waste it.

BACKGROUND INFORMATION

WHAT IS WATER?

Water is a liquid that is vital to life. Water is our most important renewable resource.

WHAT CAN WATER DO?

Water can take any shape. Water can be in three states - liquid, gaseous (steam) and solid (ice).

WHY IS WATER IMPORTANT TO US?

We need water in order to live, for food, comfort, health, industry and recreation.

WHERE DOES WATER COME FROM?

The water cycle replenishes naturally our supply of fresh water. Our sources of water are from rain, snow, stored water in lakes and reservoirs, and underground streams. Water evaporates from the oceans, cools and forms clouds, rain and snow fall to the earth, eventually running back to the ocean or evaporating, where the entire cycle starts again.

WHAT IS WEATHER?

Weather is the state of the atmosphere as to cold, heat, wetness, and dryness. Weather is always with us. It is never the same; it always changes. Sometimes it is warm, sometimes it is cold. All weather is important to us for our health and food.

WHAT IS WATER POLLUTION?

Water pollution is when water contains an unwanted substance.

WHY SHOULD WE BE CONCERNED ABOUT WATER POLLUTION?

Pollution also endangers other life that is important to our way of life. Probably the greatest danger of polluted water lies in its effect on human health. Many diseases are water-borne, and can be transmitted by drinking polluted water, washing in it, swimming in it, or eating fish and shellfish taken from it.

WHY MUST WE PROTECT OUR WATER SUPPLY?

Since water is vital to our living, and we have only the supply of rain and snow water, we must use this limited supply in a wise way so that there will be enough for all our needs. It is all our responsibility to develop good water use habits so as not to waste water and thus protect our water supply.

NOTES TO THE TEACHER

The lessons and concepts covered in this Pak are designed to first develop an awareness of the importance of water in our lives, an awareness of some of the things water can do, and finally an awareness of our responsibility to help protect and conserve our water supply.

Therefore, it is probably best if the lessons are presented in the designated sequence. They do not have to be presented daily. You may skip two or three days in between some lessons. You might want to use some additional time for some extra observation, extending an activity, or using some of the additional activities.

Each lesson is planned to take about 45 minutes. The conservation lesson and the Brine Shrimp lesson will require more than one day.

For building vocabulary, you may want to keep track of new words that you use in each lesson that have to do with water. These can be written on a large chart, or on cards. Before each lesson, you may want to review the old "water words" covered previously.

Things to do before the 1st lesson:

1. Read the complete pak.
2. Make a schedule of lessons, allowing as much time as you wish between lessons. Be sure to allow extra time for the Brine Shrimp lesson.
3. Order films, collect books. *
4. Collect materials needed that are not in the kit.
5. Order Brine shrimp from Kathy Daws - 2526.

Throughout the PROCEDURES section of each lesson, suggestions of questions and related information for the teacher is written in script type.

All materials not found in the kit can usually be easily found in school supplies, at a grocery store, pet store. Films may be ordered from the E.R.A.C. and are highly recommended. Be sure to order as far in advance as possible. All books on the book list are available in your school library, E.R.A.C., or Burien Branch of King County Libraries. You may also know of additional books, films, or filmloops that would be appropriate for this Pak.

* Some of the listed materials would be too advanced for 1st grade or too young for 3rd grade. Check through films and books for what is appropriate for your class.

MASTER MATERIALS LIST

KIT MATERIALS

School thermometer
30 clear plastic glasses
citric acid
5 trays
package of Koolaid
2 boxes of Q-tips
pan with lid
balloon
empty pop bottle
medicine dropper (to be sterilized by teacher)
1 pkg. or vial of brine shrimp
30 hand lenses
30 plastic spoons
4 pkgs. dried yeast (consumable)
2 white pipecleaners
30 paper lunch bags (consumable)
3 posters: "Bubble Trouble", "Keep Pluggin'", "Thirsty Faucets" (fun to put up in the room while teaching the unit)
30 paper cups
AAA Traffic Safety Posters

NON KIT MATERIALS

pencils for each student
crayons for each student
scissors
glue or paste
rock
any plant
shoe
12x18 white construction paper (enough for all students for several projects)
scrap box of assorted colored paper
demonstration thermometer (see Lesson 2)
pictures of various people in occupations that are affected by weather (fisherman, farmer, forest ranger, sailor, pilot, cowboy, trainman)
8 large pieces of tagboard to be used for charts
salt
sugar
vinegar
water
hot plate
blackboard
spoon
27 oz. Marine Salt (makes up 5 gallons of seawater for brine shrimp)
NOTE: You do not need marine salt if it is mixed in with the eggs already.
natural saltwater
pictures of polluted and clean water scenes
felt pen
worksheets - can be reproduced from Pak
films
books
chart or cards for Water Words (See Notes to Teacher)
Optional: 1 pkg. jello, jar of tang, package of dried soup (culminating activity)

FILM LIST

"A Time For Rain" - EBE - 1972 - 8 min. color
Examines the effects of rain on a city and its people, plants, and animals. Develops an awareness and understanding of how weather affects man's environment and activities.

"Clouds Above" - Bailey - 1964 - 9 min. color
Explains the significance of the four main types of clouds. The absorption of water by air and the process of condensation are illustrated in simple animated sequence.

"Clouds: A First Film" - FA - 1966 - 10 min., color
Introduces a variety of observations about clouds such as they have different shapes, they bring rain without which the land would be a desert, their importance to man and all life on earth.

"I Like Water" - Cahill - 1970 - 9 min., color
Presented in poetic narration, stimulates an awareness and appreciation of the importance of water. Motivation for an art activity.

"In a Fire - Seconds Count" - Film Communicators - 1971 - 18 min., color
A dramatic presentation on the vital importance of home escape route planning in case of fire.

"It's Just One Piece" - Sensory - 1974 - 13 min., color
A film designed to create an awareness of the beauty of nature, expands into specific examples of litter, air, water and noise pollution. Emphasis is on an individual's attitude toward each.

"Let No Man Regret" - Higgins - 1973 - 11 min., color
Without narration, a touching presentation of affective scenes. Contrast of before and after camping and picnic scenes inspires much worthwhile discussion about pollution.

"Make A Wish - Water" - ABC - 1972 - 12 min., color
Shows how water is unique, and important, and how very many things are related to it. Looks at cloud seeders, people who are working to make more water, how we'll all be left high and dry if current efforts of ecologists fail.

"Morning Mist" - McGraw - 1962 - 14 min., b/w
Hammy Hampster awakens to find that the river outside his house looks as though it were on fire. He decides to investigate the mystery, hops in a motorboat, and heads upstream. Soon he is engulfed in a white shroud, but suddenly the sun breaks through and the mystery is solved - it is a morning mist. Very entertaining for young children.

"Rain" - ACI - 1970 - 8 min., color
A reading readiness film. Using everyday environment and situations that have immediate identification and appeal, this film both encourages the development of language skills and teaches actual words.

"Snow" - King Screen - 1969 - 7 min., color
A visual poem, silent, cool and lovely like its subject. At first the snow falls, clothing the world in white lace, as though for a wedding. But as the snow grows heavier, it becomes more and more menacing until, at the end,

it suddenly turns into a terrifying avalanche. Good for discussion of beauty of snow, and also safety habits during winter.

"Snow, A First Film" - BFA - 1969 - 9 min., color
Shows snow's part in the cycle of the changing seasons. Tells how snowflakes are formed, how a snowfall affects our lives and introduces a vocabulary for thinking about snow.

"Snowflakes" - Moody - 1956 - 7 min., b/w
Study of physical structure of snowflakes, changes that water undergoes during the cycle.

"Uncle Smiley Goes to the Beach" - LCA - 1972 - 14 min., color
A day at the beach gives Uncle Smiley a chance to show the children how to keep their beaches safe and clean.

"Uncle Smiley Goes to the River" - LCA - 1972 - 14 min., color
Uncle Smiley and his crew take a boat trip to clean up a river - the trash along the shore and in the water - the oil that Uncle Smiley has clumsily knocked over. Shows how each individual can help fight water pollution.

"Water: A First Film" - FA - 1967 - 10 min., color
Understanding the importance of water and its uses, as well as how to avoid misusing it.

"Water and What it Does" - EBE - 1962 - 11 min., color
Shows that water is composed of tiny, moving particles, existing in 3 states - solid, liquid, and gas. Simple experiments demonstrate the mechanisms of dissolving, evaporation, condensation, freezing, and expansion.

"Whatever the Weather" - Ed Horiz. - 1960 - 10 min., color
Teaches an esthetic appreciation of weather in relation to nature, recreation, health, and beauty.

RESOURCES

PEOPLE AND THEIR ENVIRONMENT, Teachers' Curriculum Guide to "Conservation" Education, Grades 1, 2, 3, Edited by Matthew J. Brennan, J. G. Ferguson Publishing Company, Chicago, Illinois, 1972

ELEMENTARY SCIENCE STUDY, Teachers' Guide for "Brine Shrimp", Webster Division, McGraw-Hill Book Company, 1969

ELEMENTARY SCIENCE STUDY, Teachers' Guide for "Ice Cubes", Webster Division, McGraw-Hill Book Company, 1969

NATURAL RESOURCES AND ENVIRONMENTAL AWARENESS, A Teacher's Guide for Grades K-6, U.S. Department of Health, Education and Welfare, Office of Education, 1971

WHAT IS WATER, by Adaline P. Hagaman, M.S., Benefic Press, Chicago, 1960

EVERYBODY'S WEATHER, by Joseph Gaer, J. B. Lippincott Company, Philadelphia and New York, 1957

CHILDREN'S BOOKS

FLASH, CRASH, RUMBLE, AND ROLL, by Franklin M. Branley, Thomas Y. Crowell Company, New York 1965

RAIN MAKES APPLESAUCE, by Julian Scheer and Marvin Bileck, Holiday House, New York 1964

THE RAIN MAN, by Helga Aichinger, Franklin Watts, Inc., New York 1970

WHERE DOES THE BUTTERFLY GO WHEN IT RAINS?, by May Garelick, Young Scott Books, New York

AT LAST TO THE OCEAN, The Story of the Endless Cycle of Water, by Joel Rothman

MABEL, THE WHALE, by Patricia King, Follett Publishing Co., Chicago, 1958

THE KING'S FOUNTAIN, by Lloyd Alexander, E. P. Dutton & Co., Ine., New York, 1971

THERE LIVED A WICKED DRAGON, by Martha Finan, U. S. Environmental Protection Agency, 1973.

WEATHER, by Bill Martin, Jr., Holt, Rinehart and Winston, Inc.

THE BIG RAIN , by Francoice, Charles Scribner's Sons, New York

MR. BEAR'S BOW TIES, by Odille Ousley, Ginn & Co.

JUNIOR SCIENCE BOOK OF WATER, by Otis Peterson, Garrard Pub. Co., Illinois

THE STORM BOOK, by Charlotte Zolotow, Harper & Bros. New York

THE SNOWY DAY, by Ezra Jack Keats, Viking Press, New York

AROUND THE HOUSE THAT JACK BUILT, by Roz Abisch, Parents Mag. Press, New York

WHAT DOES THE TIDE DO?, by Jean and Cle Kinney, Young Scott Books, New York

THE BOLD FISHERMAN, by Mark Taylor, Golden Gates Jr. Book, CAL

A RAINBOW OF MY OWN, by Don Freeman, Viking Press, New York

SWIMMY, by Les Lionni, Pantheon

POEMS FOR WEATHER WATCHING, by Gilbert Riswold, Little Owl Book, Holt Rinehart Winston

KATY AND THE BIG SNOW, by Virginia Lee, Burton

LESSON 1
We Need Water

CONCEPTS: Water is an integral part of our daily lives.
All living organisms need and depend on water for survival.

MATERIALS: Students need pencil or crayon felt pen
Rock
Plant
Book
Shoe
Koolaid or any dry mix drink
Classroom animal or picture of an animal
Worksheet #1 for each student
2 tagboard charts (teacher prepared) - 1 titled NEED WATER, and other DO NOT NEED WATER

TIME: 30 minutes

PROCEDURE: Begin this lesson after recess if possible. Assemble students for a discussion.

How many had a good time at recess? Raise your hand if you played hard. What happens to your body when you play hard? (Out of breath, get tired - direct toward feeling thirsty) *How might you feel if it was a very hot day and you had played hard?* (Sweaty, thirsty) *When you feel thirsty, what is your body telling you it wants?* (water) *Does your body really need water? Yes it does, doesn't it. What does your body do when it is very hot outside?* (sweats) *Why would your body sweat?* (Some children may know, if not, continue with the following questions) *How many of you this past summer ran through the sprinkler or jumped into a pool? Did you feel cooler after you did that?*

Explain to the children: *When our body sweats, it is cooling off. It is actually water coming out of your skin. So when you feel thirsty, your body is telling you "I need more water". The water your body lost needs to be replaced.*

Do all people need water? Yes, all people do. Is there anything else in the world that needs water? (Open discussion.) (Spread out the rock, plant, book, shoe, koolaid, animal or pictures on a table for discussion.) *Do any of these things on this table need water?* (Discuss each object, accept all reasons from students.) Bring out charts labeled "Need Water" and "Do Not Need Water". *Let's see how many things we can think of to put on our charts.* Give each child an opportunity to say one of each. Write the suggestions on the appropriate chart. If there is disagreement, ask the student to explain his suggestion.

We know now that we need water just to live. Are there any other reasons why we need water? Let the children make their own suggestions. Some possibilities might be:

1. We need water for safety. Firemen need water to put out fires.
2. Water can be fun. Swimming, boating, fishing, water skiing, etc.
3. Water helps keep us clean and healthy.

EVALUATIVE ACTIVITY:

Pass out worksheet #1 to each child.
Draw a circle around all the things that do need water on this page.
(You might need to do 1 or 2 together to make sure everyone understands.)
Finish this page by yourself, and when you are done, I would like you to show it to me.

Later, when everyone is done, you may wish to go over the page as a class. The children could clap hands or stand up as an item that needs water is called out. Be sure to ask for reasons why children circled certain items. This page should bring out the idea that both living and non-living things need and use our water supply.

ADDITIONAL ACTIVITIES:

1. Have children look through old magazines for pictures of things that do need water and pictures of things that do not need water. These, then, can be pasted on additional charts "Need Water" and "Do Not Need Water", or put up on the bulletin board by the previously written charts.

2. Have a table where the children can come and experiment with measuring water. Have ½ cup, cup, pint, quart, ½ gallon, and gallon containers available. Also have paper towels handy to wipe up spills. You might want to leave this set up for several days and involve it into math lessons.

3. Show the films: Make a Wish - Water and I Like Water

4. Place a stalk of celery in colored water to enable children to see that plants actually absorb water.

5. Show film In A Fire - Seconds Count.

6. Begin WATER WORD CHART. With felt pen write all words covered in lesson that had to do with water: water, thirsty, drink, sprinkler, sweat, swimming, boating, fishing, safety.

7. Take a field trip to a fire station.

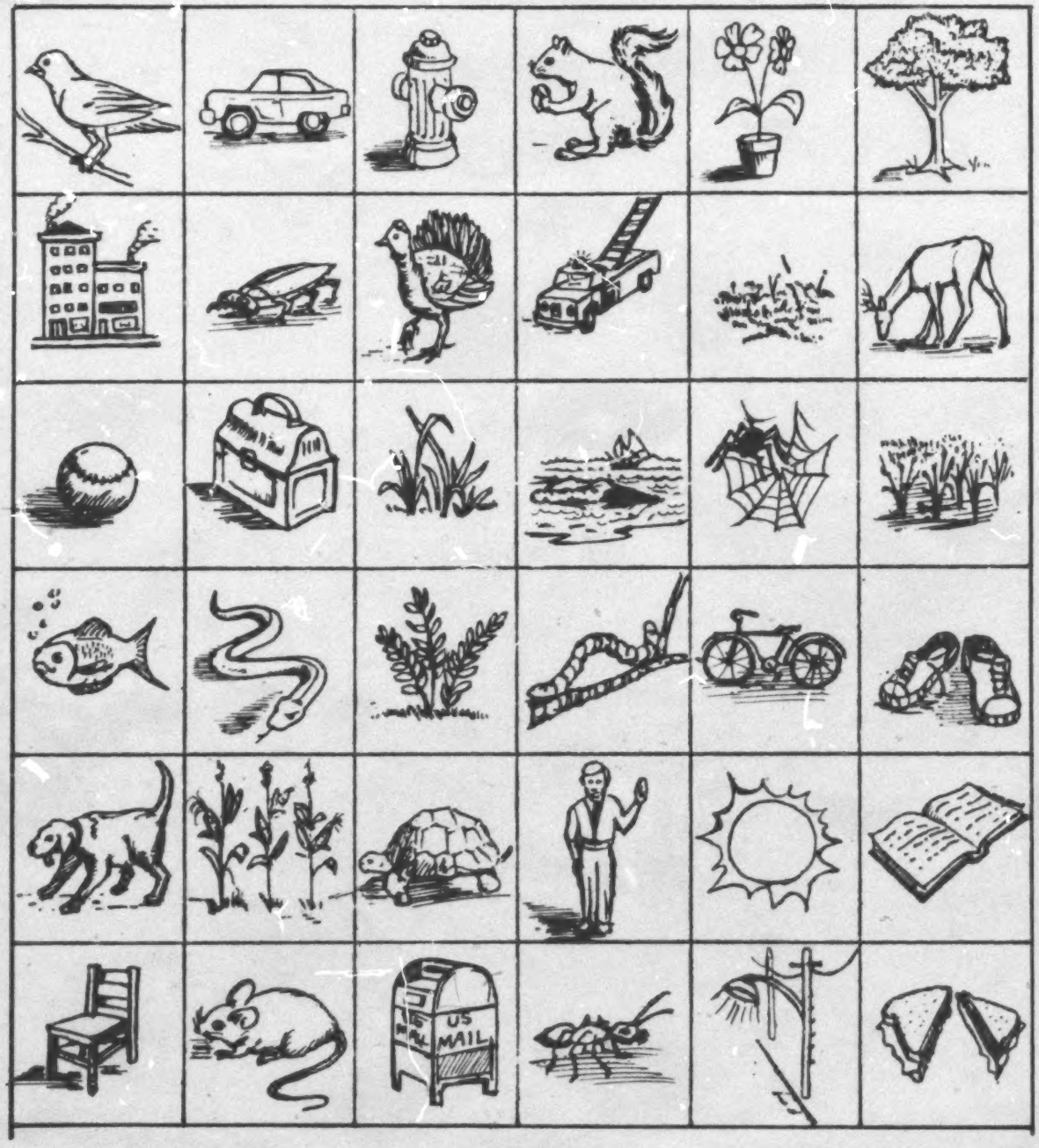
8. Invite a fireman to come to school or class to talk about fire safety.

9. Language Experience Activity: Have each student say or write a sentence or two on "How I Use Water", and then make a picture. A fun idea is to record on a cassette each child saying his way(s) of using water. Then put pictures together into a book, make a pocket to hold the tape inside the book cover and you have a free time listening activity for your listening center.

WORKSHEET #1

NAME _____

Circle all things which need water.



LESSON 2
Weather

CONCEPTS: Weather is our natural supply of fresh water.
Weather conditions are always changing.
Water is very much a part of weather systems.
Weather affects everyone's lives, and many peoples' jobs.

TIME: 45 minutes

MATERIALS: Demonstration thermometer - see below
School thermometer - try to get one with fairly easy to read numbers
5 copies per student of Worksheet #2
Optional: Pictures of various occupations that are affected by weather: fisherman, farmer, forest ranger, sailor, pilot, cowboy, trainman, etc.
Calendar cut-outs for each child

PREPARATION: Have available the copies of Worksheet #2 to be used over the next 5 days. For the daily observation, a child can take the thermometer outdoors. If this is not practical, the thermometer can be placed outside a window and observed from inside the classroom. The thermometer could be taped to the outside window facing in. Try to select a window that will be in the shade at the time the reading will be made.

Optional: Have ready the pictures of people at various occupations for the discussion.

Read through the entire lesson.

PROCEDURE: Assemble students for discussion.

Who remembers what it is that we talked about yesterday that everyone needs? (Water) *Where does our water come from?* (Lead the discussion to the fact that rain and snow are our main sources of fresh water, and that, therefore, the weather is very important to us.)

I noticed that many of you wore _____(this depends on the weather that day; could be no coats, rain coats, sweaters, etc.) *to school today. Can some of you tell us why you did that?* (Lead discussion into weather - that it causes us to wear certain clothes and changes our lives). Talk about different kinds of weather.

We are people that go to school and the weather makes us wear certain clothes some days, and sometimes we walk or get a ride, depending on the weather, sometimes we don't have recess because it is too rainy. Can you think of other people that the weather is important to? Would weather sometimes make it hard for some people to do their jobs? (Let students bring up their own suggestions. If they have difficulty, ask about some of the following occupations.)

Farmer: "Make hay while the sun shines." A farmer can't cut hay when it is raining. Wet hay rots, and then cows and horses would have no food, and there would be a shortage of milk and meat. Weather helps the farmer to know when it is right to plow, sow, and harvest.

Forest Ranger: In certain weather, forest fires start more easily. The forest ranger can help protect trees from fires if he knows what weather is coming - winds, lightning, etc.

Sailor: "Red sky at night, sailor's delight. Red sky in the morning, sailors take warning." A sailor needs to know ahead if there is to be a storm, so that he can go into a harbor where it would be more safe for his boat during the storm.

Pilot: A pilot needs to know what weather is ahead so that he can fly around a storm if he needs to. Pilots must study weather and meteorology before they can become pilots.

Cowboy: A cowboy should not move his animals very fast on a hot or windy day, or they will lose too much weight and not be healthy animals.

Fisherman: "Fish bite best when the wind is in the west. Fish bite least when the wind is in the east." Some kinds of weather are good for fishing, in other kinds of weather, the fisherman will not catch very many fish.

Trainman: Trains carry fresh fruits and vegetables in special refrigerator cars. They must adjust the temperature of the car depending on the weather. Also, heavy rains can cause floods that wash out train tracks. A trainman needs to know about the weather ahead so that he can protect lives.

Sportsman: A sportsman enjoys outdoor activities, which often are more enjoyable in better weather.

Housewife: A housewife can not hang her laundry out to dry on a wet day.

Pass out one copy of Worksheet #2 to each child (or stapled group depending on your procedure).

We are going to keep track of the weather for the next few days and see the different kinds of weather we have. Each day we will fill out a sheet just like the one you have now.

The children should discuss the selection of the time for recording the daily weather. They record the weather the first day together, discussing each step as they proceed.

a. The children use the flag illustrations to record velocity. If they are able to see the school's flag this should be used to help them determine the velocity. If the flag is not convenient, they can decide how a flag would probably be moving on that day by watching other signs such as the movement of tree branches. They will check the appropriate box to show no wind, little wind or strong wind.
b. The children record the sky condition by checking the box under the appropriate picture: no clouds, a few clouds, overcast.

c. Precipitation should be recorded by checking the box under the picture: rain - yes or no.
d. The temperature should be recorded first on the demonstration thermometer by moving the indicator to the proper level. The demonstration thermometer should be located somewhere in the room where all children can see it. The children then record the temperature on their chart by filling in the thermometer indicator column.
e. A blank space is provided to the right of the precipitation box that could be used to record fog, snow, etc.

On each of the next four days, the children can work independently and record their observations on a worksheet. One child or a group can be responsible for recording the temperature on the demonstration thermometer. The children should decide what time of the day to do this. Set aside a time to discuss each day's recording.

ADDITIONAL ACTIVITIES:

1. Have the children ask at home whether the weather affects their parents jobs and brothers and sisters activities (sports, lessons, walk to school or ride), and report back to class.

2. Read books: Rain, Rain, Rivers; The Rain Man; Rain Makes Applesauce

3. Show films: Rain and A Time For Rain

4. Make a terrarium and watch for the "rain" in it.

5. Read "Where Does the Butterfly Go When It Rains?" and have children paint a water color painting of where they think the butterfly goes when it rains. Discuss the art form of water color, i.e. using water to paint, what to do with the dirty water. You might want to save some of the dirty "paint" water for the optional filter activity in lesson 9.

6. Add to Water Words chart - temperature, thermometer, precipitation, rain, clouds, fog, mist.

7. Show filmstrip "How to Make a Terrarium".

8. Read books: "Poems for Weather Watching", "Mr. Bear's Bow Ties", "Flash, Crash, Rumble, and Roll". Children can draw illustrations to go with the books.

9. Make calendar cut-outs: Children can color and cut out. Have an envelope for each near your room calendar. Let children check weather each day and hang up appropriate weather signs and see the progression during the month.

10. Make a bar graph to show and record outside temperatures each day for as long as is desired. This would be especially interesting in an area where seasons might change rapidly.

11. Read the Rain Man. Let children write their own stories about who they think makes the rain or what might happen in a rainstorm.

12. Print Rain Makes Applesauce on a large chart and use for a choral reading activity.

13. Have some old clothes that would be worn only in certain seasons. Let children choose what they would wear for certain seasons. (1st grade)

14. Read Poems for Weather Watching.

15. Hide and Seek Fog, by Alvin Tresselt and Roger Duvaisin covers concepts of what fog is, mist, and how a seaside community's activities change due to fog.

16. Mr. Bear's Bow Ties. Entertaining story for young children; tells story of how Mr. Bear has a different colored bow tie for each kind of weather.

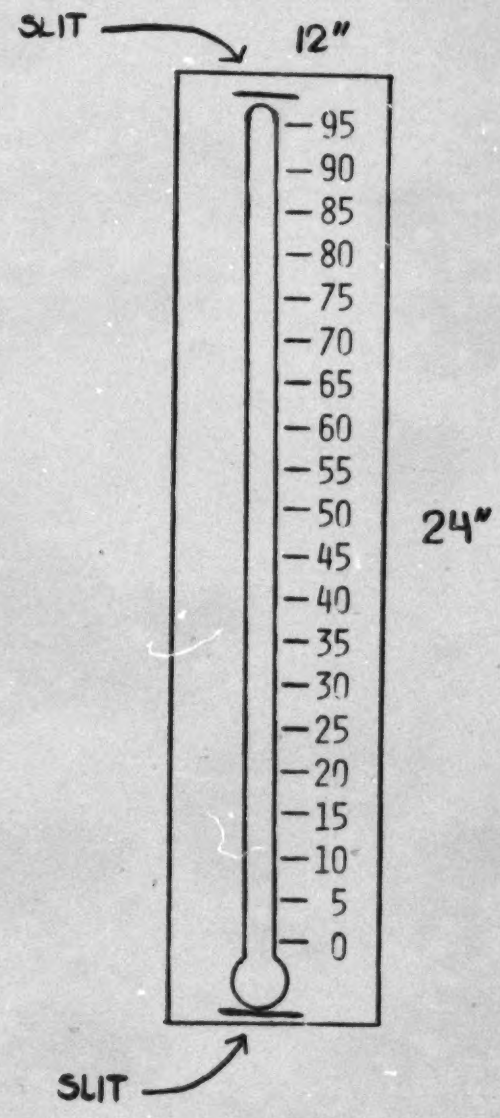
17. Have children listen to weather reports at home each night that week and report back the next morning what the forecast was.

NOTE: Have class fill up paper cups and mark the level of the water with a crayon. These then are to be frozen in preparation for lesson #3.

Demonstration Thermometer

Materials:
1 piece of cardboard 24"x12"
felt pen
24" of red seam tape or ribbon
24" of white seam tape or ribbon

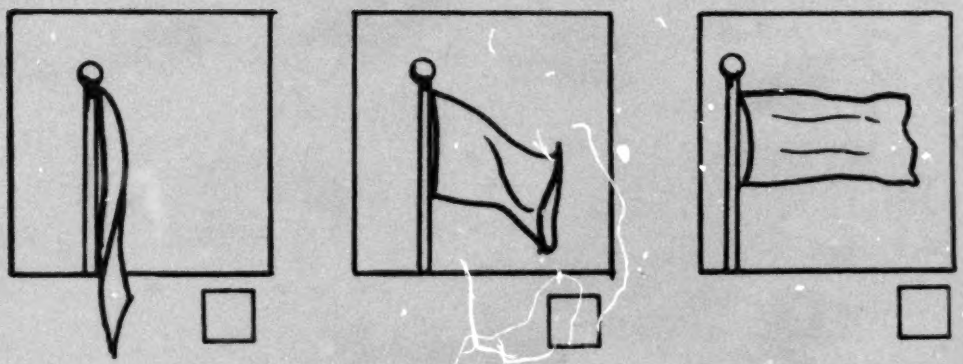
Draw a thermometer with degrees as shown on the cardboard. Cut a slit the width of the ribbon at each end of the thermometer. Sew the red and white ribbon together at one end. Insert ribbon in slits, sew other two ends together. Ribbon can be rotated to show more red or white, depending on the designated temperature.



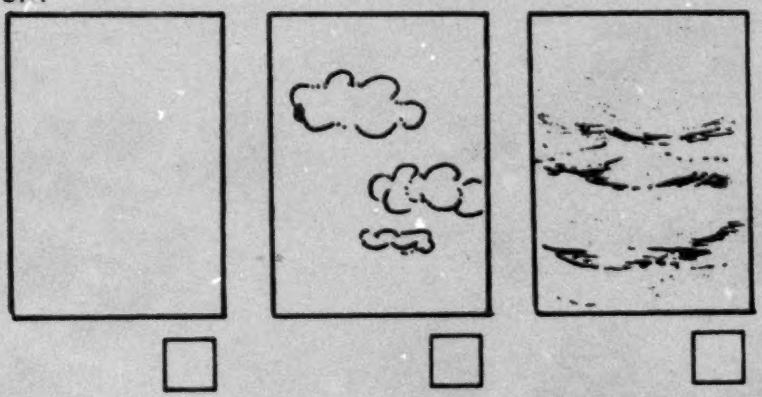
WORKSHEET #2

NAME _____

WIND

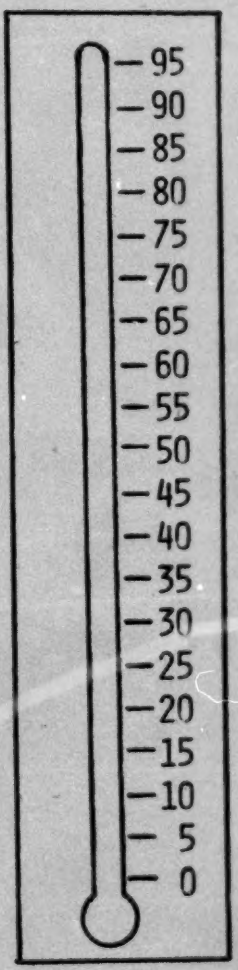


SKY



RAIN

YES NO



TEMPERATURE

CALENDAR
CUT OUTS.
SUN
RAIN
CLOUDY
WINDY
SNOW

Rain, Rain, Rivers

Words and pictures by Uri Shulevitz
Farrar, Straus and Giroux, New York, 1969

It is raining outside. I can hear it.
The rain is pattering on the window.
The rain is pattering on the roof.
It rains all over town.
Rain rolls down the roofs, rushing down the eaves, gushing out the drainpipes.

Streams stream in the gutters.
Tomorrow I'll sail my little boats.
It rains! It rains over fields.
It rains over hills. It rains over grass.
It rains over ponds too.
Frogs, stop your croaking! Take cover in the water and listen to the rain.
It pours. Streams are streaming.
Rills roll down hills, fall into brooks, rush into rivers and race to the sea.

Waves billow and roll, Rush, splash and surge, Rage, roar and rise.
Oceans are swelling, melting the skies.
It rains. Tomorrow new plants will grow.
Birds will bathe in the streets.
We'll run barefoot in puddles and stamp in warm mud.
I'll jump over pieces of sky in the gutter.
It rains all over town. The plant on my window is beginning to grow. I know it.

Creative Writing Activity: Have children write, tell, make pictures about what they do in the rain. You might want to make another listening book.

THE RAIN MAN by Helga Aichinger

Franklin Watts, Inc.
575 Lexington Ave.
New York, New York 10022
1970

In the big meadow stood the Rain House. There the Rain Woman made her clouds. When the Rain Bird sang on the roof, the Rain Man piled his ship full of clouds and said, "It's time to have it rain again." Then he started to travel.

Through his telescope he looked down at the earth. All the flowers and plants had dried up, all the bushes and trees had withered.

Steering the clouds over to them, he let the rain fall gently. Soon all the plants, trees, and bushes turned green again, and the flowers sparkled.

"Now it has rained enough", said the Rain Man, and he opened his sun umbrella. Above it, the sun made a beautiful rainbow.

Suddenly the dog who tells the winds what to do rushed by and snatched away the sun umbrella. "Stop!" shouted the Rain Man. So the Wind Dog dropped the sun umbrella, and it fell to the earth.

The beautiful umbrella lay upside down on the ground. A girl named Mary, her pet rooster, and her cat were surprised. Whose pretty umbrella is this? they all wondered.

All of a sudden, the sun umbrella rose from the ground, lifting Mary, the rooster, and the cat high up above the roofs and woods, right up into the Rain Ship. That pleased the Rain Man.

Then the Rain Man decided to catch the wind dog. The rooster jumped on the Wind Dog's nose.

The cat clawed the Wind Dog's back. The Wind Dog growled furiously but the Rain Man tied him up.

Mary, the rooster, and the cat had to get back home to the earth. So the Rain Man put little blue hooded coats on them, buttoned them up, and said, "Now you can fly." So the rooster flapped his wings and said, "Great! I never flew this well in my life before." Mary and the cat flew after him, back home to the earth.

And the next time the Rain Bird sings, the whole game will start over: Rain Man will come back--and it will rain!

Also see RAIN MOUSE by Helga Aichinger

RAIN MAKES APPLESAUCE by Julian Scheer and Marvin Bileck
1964 by Holiday House, New York

The stars are made of lemon juice, and rain makes applesauce.
I wear my shoes inside out, and rain makes applesauce.
My house goes walking every day, and rain makes applesauce.
(Oh you're just talking silly talk.)

Dolls go dancing on the moon, and rain makes applesauce.
The wind blows backwards all night long, and rain makes applesauce.
(Oh you're just talking silly talk)

Monkeys mumble in a jelly bean jungle, and rain makes applesauce.
Candy tastes like soap, soap, soap, and rain makes applesauce.
(Oh you're just talking silly talk.)

Monkeys eat the chimney smoke, and rain makes applesauce.
Tigers sleep on an elephant's snoot, and rain makes applesauce.
(Oh you're just talking silly talk.)

Clouds hide in a hole in the sky, and rain makes applesauce.
Salmons slide down a hippo's hide, and rain makes applesauce
(Oh you're just talking silly talk)

My teddy bear sings out loud at night, and rain makes applesauce.
Elbows grow on a tickle tree, and rain makes applesauce.
Oh you're just talking silly, silly talk.
I know I'm talking silly talk...But--
Rain Makes Applesauce.

WHERE DOES THE BUTTERFLY GO WHEN IT RAINS? by May Garelick
Young Scott Books
New York

Rain. Rain. Rain. Rain. Where does the butterfly go when it rains?

And the mole and the bee and the bird in the tree --- where do they go when it rains? A mole can stay in his hole.

A bee can fly back to her hive.

I've heard that a bird tucks its head under its wing. But where does the butterfly go when it rains?

I know that my cat goes scat under the porch. I've seen him do that when it rains.

A snake, I suppose, can slide between rocks.

A grasshopper can hide in tall grass.

A rabbit can dash--whoosh--into a bush. But where does the butterfly go when it rains?

The cows I see in the field just stand in the rain and get wet. They eat and get wet and eat and get wetter. Don't cows mind the rain?

I know why a duck doesn't mind the rain. Someone told me. A duck's feathers are oily and slick, so the rain doesn't stick. Water slides off a duck's back. "Quack. Quack."

But what about minnows and how about trout? Where do fish go when it rains? Pooh! That's silly. It doesn't rain under water!

What does a turtle do in the rain? If I were a turtle with a shell over me, I would know what to do in the rain, wouldn't you?

But what can a butterfly do? How can it fly if its wings are wet? Where does the butterfly go when it rains? And the bird in the tree is a puzzle to me. Even if his head is tucked under his wing, what happens to the rest of him, poor thing?

As soon as the rain stops raining so hard, I'll go quietly up to a tree. And maybe I'll find a bird in that tree, and I'll see what it does in the rain.

Maybe I'll find a butterfly, too. Then I'll know what it does when it rains.

But where can I look? I've never seen a butterfly out in the rain. Have you?

LESSON 3
Ice Cubes

CONCEPT: Water expands as it freezes.
Water requires a temperature of 32 degrees or below in order to freeze
Water temperatures change slowly.
Ice is the solid form of water.

MATERIALS: Worksheet #3 for each student
pencils
Optional: mirrors
30 paper cups with 1/4 cup of frozen water in them.
AAA Safety Posters

TIME: 45 minutes

PREPARATION: Water in cups should be frozen ahead of time. Check with the school cook on using the freezer. If freezer facilities are not available, wrapping the ice in newspaper and then placing in an ice chest should keep them frozen enough if you plan the lesson early in the day. Also, 1 cup of ice for every 2 students would make bringing your own ice easier.

PROCEDURE: Teacher brings out one of the cups of frozen water. Do not let the children see what you have. Play the game "20 Questions". The children may ask you questions, and you may only answer yes or no. If they are having difficulty, you may give them the clue that it is a special kind of water.

After they guess that it is ice, ask: *What is ice?* (frozen water) *How did it get that way?* (Was put someplace very cold, like a freezer.) *How long do you think it takes water to turn into ice?* (Open response) *Since we don't have a freezer in our classroom, it would be kind of hard for us to do that, but you might want to experiment at home and let us know what you find out.*

Pass out cups of ice to individual students.

Look very carefully at your ice. How can we describe it? What is ice like? (cold and hard) *Remember yesterday when we filled the water up to the _____ mark* (whatever mark is on the paper cup, or you may mark the cups yourselves.) *Do you notice anything different today? Yes, the ice is above that mark. How did that happen?* (Let the children guess).

Everyone hold out their right hand and just let it hang limp and loose. Now, when I count to 3, spread your fingers out as quickly as you can. (Repeat) *Which way does your hand take up more space? Yes, when it is spread out. You still have the same number of fingers, but they take up more space when they are spread out and stiff. That's sort of what happens to a water drop when it freezes.*

Introduce the word "estimate", which means to guess or approximate.

How long do you suppose it will take the ice to melt? (Write estimates on the board.)

As we watch our ice melt, do you notice anything changing? (There should be water forming around the ice, and water forming on the outside of the cup.) *Where is the water on the inside of the cup coming from?* (the melting ice) *Where is that water on the outside of the cup coming from?* Let the children guess. If some say it is coming from inside the glass, pour some water into another cup and see if it leaks through.

Is the water leaking through? Well, it must be coming from somewhere else. Can you think where that might be? (Allow for responses). If they have trouble figuring it out, ask: *What is right around the glass? It is something that is around us all the time, even though we can't see it. Yes, air. There is water in the air, and because of the cold ice, that water in the air gathered around the cup and turned into water drops on the side of the cup.*

Have you ever seen your breath on a cold day? Those are little tiny droplets of water that you see when you breathe on a cold day.

EVALUATIVE ACTIVITY:

Pass out Worksheet #3 to each student.

On the top ½ of the worksheet is a picture of the student's cup of ice. Beside this picture are two boxes labeled changes. The student should draw the changes he saw take place on the outside of the cup, and the changes he saw take place on the inside of the cup. He can use blue crayon for liquid water, and white crayon for ice.

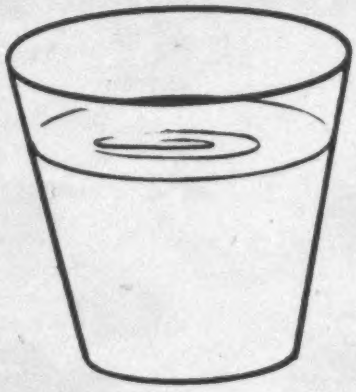
Below, on the second half, are 2 boxes labeled Slower and Faster. The student should think of ways he could make his ice cube melt faster and ways to make his ice cube melt more slowly. He may experiment with his ice cube. He should then draw a picture of a good way to make an ice cube melt faster, and show a picture of a way to keep an ice cube from melting.

NOTE: You might want to limit ideas on this, such as without electricity, gas, etc.

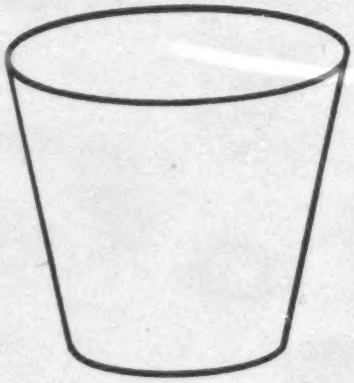
ADDITIONAL ACTIVITIES:

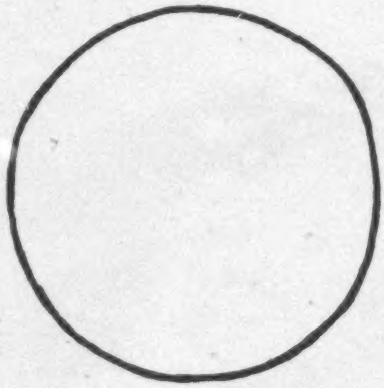
1. Films: "Snow"
   "Snow - A First Film"
2. Cut out snowflakes.
3. See ESS Ice Cubes Unit for additional activities and experiments.
4. Experiment with different ways to melt ice.
5. Time how long it takes to feeeze water.
6. Vocabulary for Water Words chart: condensation, insulation, ice, cold, snowflake, ice skate, melt
7. Read book Katy and the Big Snow, by Virginia Lee Burton. Shows interaction of community helpers as they face a large snowfall.

NAME _____ WORKSHEET #3



CUP WITH ICE





CHANGES: OUTSIDE AND INSIDE

FASTER

SLOWER

LESSON 4
Ice and Snow

CONCEPTS: Frozen water has many uses - food, recreation.
Cold weather changes our lives.
Safety is important in the winter time.

MATERIALS: 12x18 white construction paper
Scraps of all colors of construction paper
Crayons
Scissors

TIME: 45 minutes

PROCEDURE: Review some of the concepts covered yesterday. *We learned yesterday that water is not always a liquid. What else could it be?* (Ice) *What is ice like?* (cold and hard) *What does water need in order to turn into ice?* (cold temperatures) *Does water take up more space or less space when it is frozen?* (more space)

What season of the year usually makes water turn into ice? (winter) *What is different about winter from other seasons?* (usually colder) *What are some kinds of weather we have in the winter?* (rain, snow, ice, frost) *What might we have to do differently in the winter from other seasons in the year?* (Open discussion) Some possibilities might be wear warmer clothing, stay indoors more.

What are some things we should be thinking about during winter weather?

1. Dress properly so you don't get sick.
2. Be careful walking on slippery surfaces.
3. Stay off snowy roads - cars have less control.
4. Don't walk on frozen ponds without an adult to make sure it is safe.
5. Stay off thin ice.

Ice and snow make us wear warm clothing, and be careful on the streets, etc. What are some things frozen water can do for us to make our lives more enjoyable? Some possibilities might be: popsicles, keep food cool, fun - skiing, sledding, building snowmen, iceskating, ice in cold drinks , ice packs for injuries.

EVALUATIVE ACTIVITY: Pass out 12 x 18 white construction paper. You might want to vary this activity depending on the season at the time of the lesson. In non-winter, have children draw and tell or write about how frozen water is used and is helpful to us. In winter, have the children draw and write about safety rules to remember during winter. For extra motivation, you may want to show traffic safety posters from the Automobile Club of Washington.

ADDITIONAL ACTIVITIES:

1. Films: "Snow"
   "Snow - A First Film" (if not viewed yesterday)
   "Snowflakes"

2. Draw pictures of winter fun.

3. Draw or make a picture of yourself dressed for winter weather.

4. Vocabulary for Water Words Chart: frozen, slippery, cold, frost, winter, popsicle, snowcone.

5. Ask the school cook to come in and tell briefly how the freezers are important to her as she prepares school lunches.

LESSON 5
Dissolving

CONCEPTS: Water is capable of dissolving certain substances.
Water may look clean, but really be harmful to drink or use.
Living things need clean water to live healthy lives.

MATERIALS: 25 clear plastic glasses: 5 with salty water in them
5 with sugary water in them
5 with clear water in them
5 with citric acid in them
5 with vinegar in them
5 box tops, trays, to hold one glass of each solution (5 glasses on a tray)
2 boxes of Q-tips (5 per child)
5 paper bags for used Q-tips
pencil for each child
12x18 white construction paper for each child
crayons for each child
copies of worksheet #4 for each student

TIME: 45 minutes

PROCEDURE: Hold up one tray of the 5 solutions. *What do you see on this tray?* (They should all look like clear water.) *Can you be sure just by looking? What else could you do to be sure?* (feel, smell, taste)

We are going to be scientists to discover just exactly what these solutions are. You are going to be using your nose and mouth to help you find out. And just like a scientist, you will write down what you discover.

Divide the class up into teams of 6 people. If necessary, let them move so that they will all have access to the solutions. Let the groups get settled and then pass out the Q-tips and paper bags and worksheet #4. Instruct the children that the Q-tips are to be used for tasting the solutions.

After you have tasted the solution once, what should you remember to do with your Q-tip? (Don't put it back in a glass, throw it away in the paper bag.) *You each have 5 Q-tips, 1 for each solution.* (Stress strongly that they remember not to put the Q-tip back into the glass, but don't discuss why just yet.) *Then circle what you think you tasted.* (Go over the choices to make sure students understand each one.)

Conduct the tasting and smelling of each solution together. Ask the following questions about each solution: *What does it smell like? What does it taste like? What do you think has been added?* Allow for several responses from the class.

After all solutions have been tested, collect them and have students return to their desks if necessary.

We found out that there was something besides water in 4 of those solutions. Why couldn't we see it? We call this DISSOLVING. (Write dissolving on the board or have it written on a card.) *The salt, sugar, vinegar and citric acid were mixed in so well, we say they were dissolved in the water.*

We were all quite careful with our Q-tips. What else might have been in the water if we hadn't been careful? Why do you think we could not put our Q-tips back into the solutions? Yes, we might have put some germs into the water. Could we see those germs? (If some children think so, have one child put his used Q-tip into the water). *Can we see _____'s germs? No, germs are very tiny and we cannot see them with just our eyes.*

What do we need to think about then before we take a drink of water? (Whether or not the water is clean.) *Who takes care of making sure our water here at school and at home is clean enough to drink?* (The Water Department) *Where are some good places to drink water? Where are some not so good places to drink water?*

What would you tell someone if you were trying to have him understand that he should be careful of where he drinks his water?

What do you think would be a good way to remind people to be careful of where they drink their water? What are out on the roads to help people remember to drive carefully? (Signs - discuss several kinds of signs)

We're going to make signs today to help people remember to be careful about where they drink water.

Pass out 12x18 white construction paper. Instruct students to fold their paper in half, and then lay it out flat again. On one half, they are to draw a picture of a good place to drink water. On the other half, they are to draw a picture of a place that is not good to drink water. They can label one side "GOOD" and the other side "NOT GOOD".

ADDITIONAL ACTIVITIES:

1. Invite a person from the Water Department to come and talk to the class.
2. Show film "Water and What it Does"
3. Vocabulary for Water Words Chart: dissolve, drink, taste

WORKSHEET #4

NAME _____

DIRECTIONS: TASTE THE WATER IN EACH CUP. CIRCLE THE WORDS THAT TELL HOW IT TASTES.

1.	SWEET SUGAR	SOUR LEMONS	SALTY OCEAN	SOUR PICKLES	PLAIN WATER
2.	SWEET SUGAR	SOUR LEMONS	SALTY OCEAN	SOUR PICKLES	PLAIN WATER
3.	SWEET SUGAR	SOUR LEMONS	SALTY OCEAN	SOUR PICKLES	PLAIN WATER
4.	SWEET SUGAR	SOUR LEMONS	SALTY OCEAN	SOUR PICKLES	PLAIN WATER
5.	SWEET SUGAR	SOUR LEMONS	SALTY OCEAN	SOUR PICKLES	PLAIN WATER

LESSON 6
Evaporation - "Water's Disappearing Act"

CONCEPTS:
Water is in the air.
Water takes a gaseous state when it evaporates.
Heat and/or wind can speed up evaporation.

MATERIALS:
water
hot plate
blackboard
pop bottle
balloon
copy of Worksheet #5 for each child
pencil or crayon
Optional: Evaporation written on card

NOTE: Set up water, hot plate, pop bottle and balloon ahead of time if possible, as it takes about 15 minutes for water to heat up enough to start expanding balloon.

TIME:
45 minutes

PROCEDURE:
How many of you boys and girls know what a magician does? He does magic tricks, doesn't he? Doesn't he sometimes make things disappear? It's pretty hard to figure out how he does it sometimes, isn't it? Do you think water can just disappear?

I need 2 helpers. (Choose any two students.) *I would like both of you to put one hand in this pan of water. Make sure your whole hand is wet. Now, make a hand print on the blackboard* (students should be situated so that everyone can see). *Now do the same thing with the other hand. Thank you. You may sit down now and watch your hand prints.*

What is happening to the handprints? Yes, they are disappearing. Does anyone know the word we use when we say that water is disappearing? EVAPORATION. Let's say it together. EVAPORATION. Write the word on the board by the hand prints, or have it wirtten on a card.

Where is the water going when it evaporates? Can we see it? Yes, it just disappears into the air. Is there any way we could make it evaporate faster? (open discussion) Allow a couple of students to try out their ideas. Someone will probably suggest fanning it. Let them demonstrate, or suggest it yourself. *Good thinking! Wind can make water disappear faster.*

Now I would like to show you something else interesting that water can do that is connected with evaporation. I have here a bottle with a little water in it, a pan with some water in it, this hot plate, and a balloon. I'm going to put the bottle in the pan, plug in the hot plate and put the balloon over the top of the bottle. (Have students help you with each of these tasks if you wish.) While the water is heating up, make sure that everyone will be able to see.

Watch carefully as the balloon begins to inflate. *Why is the balloon blowing up? What is the water in the bottle doing?* (Turning into steam)

What can heat do to water? (Turn it into steam) You might need to hold onto the balloon so that it doesn't pop off from the pressure of the steam.

Take the bottle out of the pan, away from the heat. Watch the balloon deflate. *Now what is happening to our balloon? Why? There is no more heat, so the steam is cooling down and changing back into what? Yes, water.*

What else besides wind can make water evaporate? Yes, heat. When water evaporates, do you think it takes up more or less room than before it started evaporating? Why? Yes, it takes up more room because you saw it expanding and blowing up the balloon. What happens when steam, which is evaporated water, cools? Yes, it changes back into water.

What are the 2 things we have learned about that make water evaporate? Yes, wind and heat.

If students are not at their desks, they should return now.

EVALUATIVE ACTIVITY:

Pass out Worksheet #5 to each child.

The children should consider the worksheet carefully and mark with an X all the things they can find from which water is going into the air (evaporating). They then count the number of places they have marked and write the number in the blank at the top of the page.

X - 2 glasses, melting popsicle, spilled drink, open thermos, open jar, towel and lake.

How many? Answers will vary, although the usual is 8.
Discuss the answers together at end of lesson or next day, depending on time.

ADDITIONAL ACTIVITIES:

1. Let children experiment to see how long it takes a drop of water to evaporate, and different ways they can speed up or slow down evaporation.

2. Look for machines at home that are made for evaporating H_2O. (Dryer, hairdryer)

3. Worksheets #6 and #7. Color the picture where water is drying up the fastest. Discuss choices, whether it is wind, heat or both affecting the evaporation.

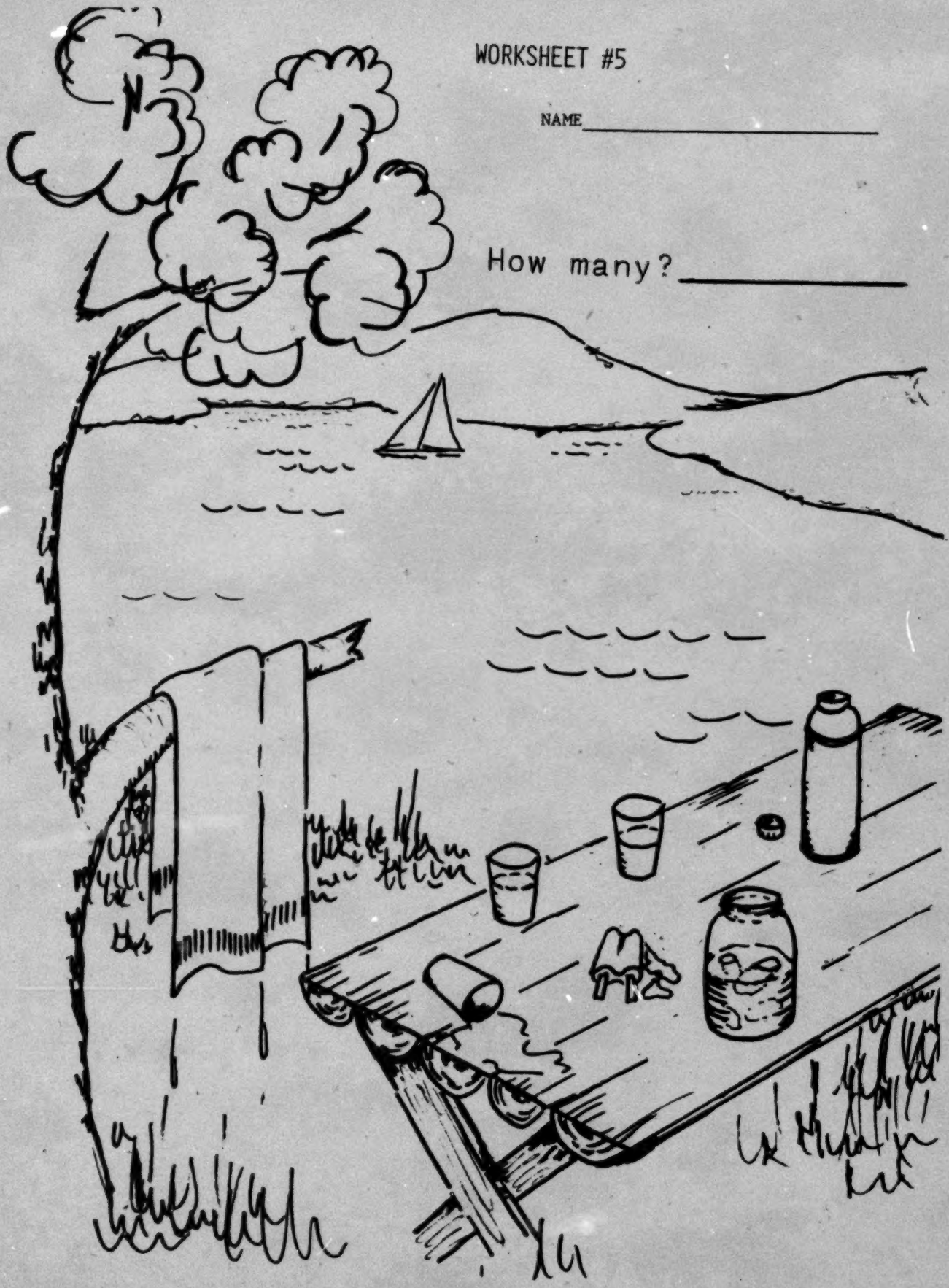
4. Iron a damp cloth with a hot iron on a padded surface. Children will be able to see the steam and feel the resulting dry cloth.

5. Vocabulary for Water Words Chart: evaporation, dry hairdryer, wind, heat.

WORKSHEET #5

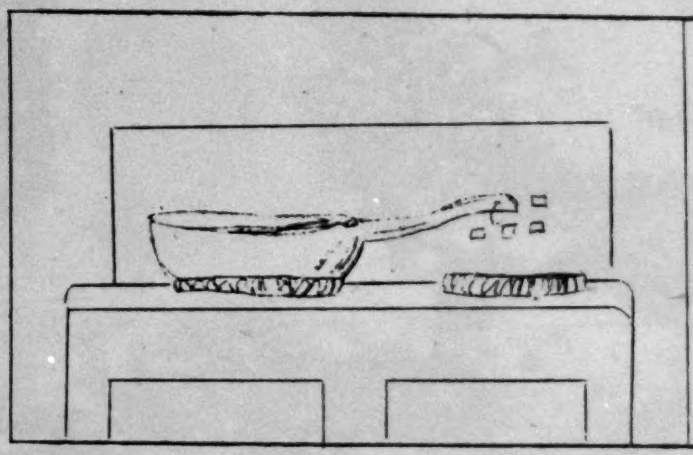
NAME_____

How many? _____



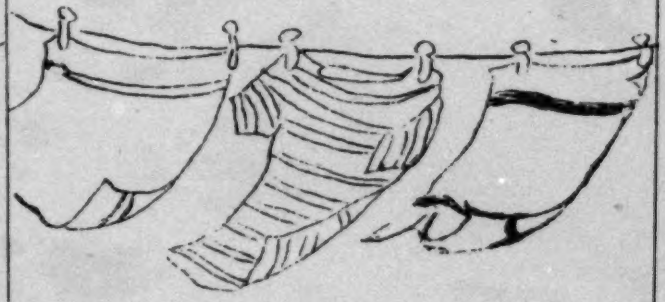
NAME _____ WORKSHEET #6

COLOR THE PICTURES THAT SHOW WATER DRYING UP THE FASTEST.



1.

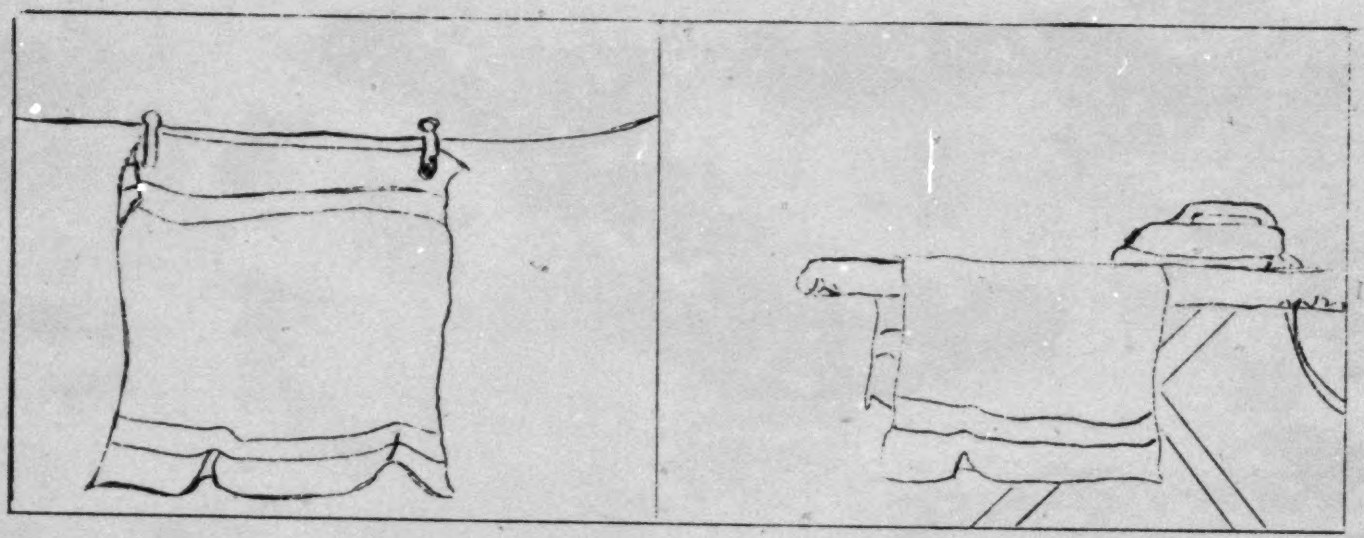
2.

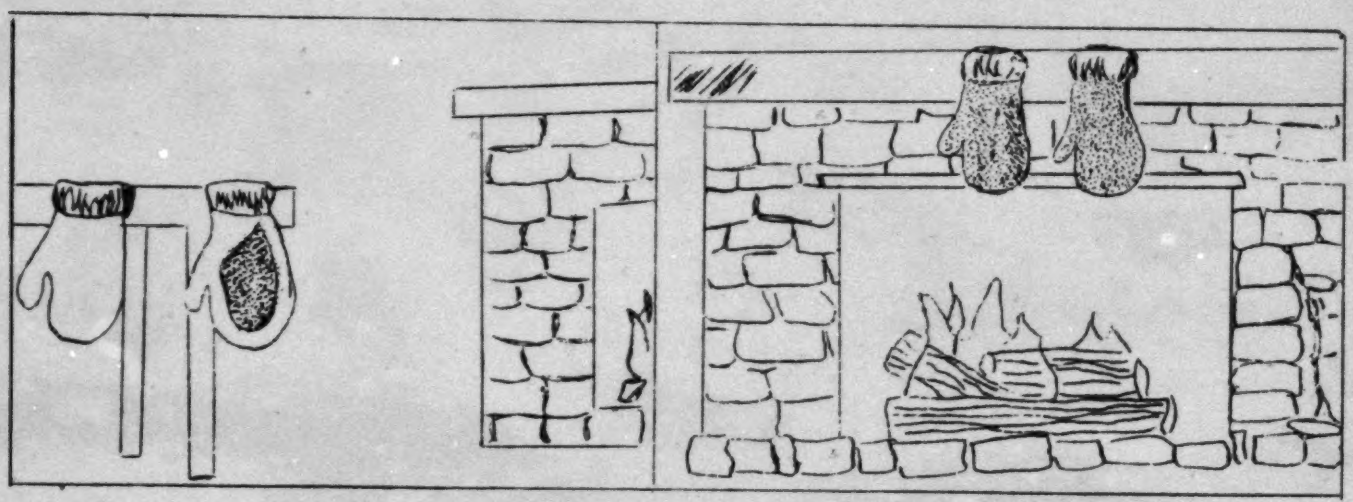


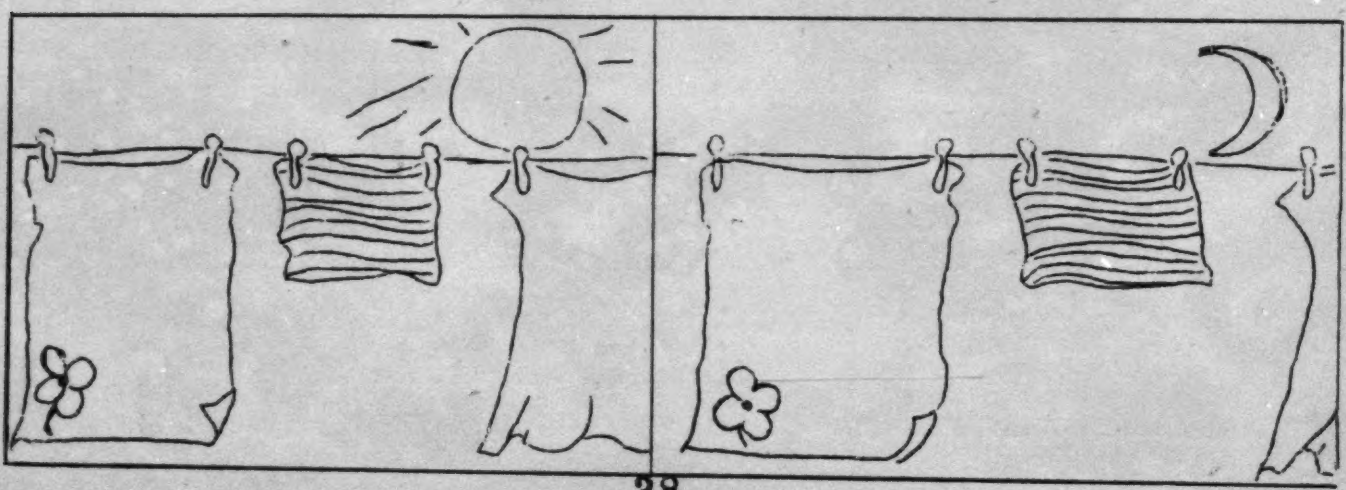
3.

NAME _____ WORKSHEET # 7

COLOR THE PICTURES THAT SHOW WATER DRYING UP THE FASTEST.







LESSON 7
Evaporation and Condensation

CONCEPTS: Cooling causes water in the gaseous state to return to the liquid state.
Substances dissolved in water do not evaporate with the water molecules.
The water cycle involves mainly evaporation and condensation.
Man is experimenting with ways to get fresh water from salt water.

MATERIALS:
Water
Salt
Pan with lid (glass is best, because you can see water droplets condensing on the lid)
Hot plate
Spoon
Cup
Medicine dropper (clean & sterilized by teacher)
12x18 white construction paper for each child

TIME: 45 minutes

PROCEDURE: Arrange students around demonstration table so that everyone will be able to see.

What did we learn that water could do yesterday? Yes, it disappears. What is the new word we learned? Yes, Evaporation. How does water evaporate? (with wind and/or heat)

I have something else I would like to show you about evaporation today. We are going to use the hot plate again, and the pan, and some water. (Ask for helpers to get it set up, explaining as you go along.) *Today we are going to add some salt to our water. Is there salt water anywhere on the earth? Yes, in the oceans and also in the Great Salt Lake. We'll stir up the salt. Now let's choose someone to test it and make sure that they can taste the salt.* (The pan of salt water should be on the hot plate warming up during this time.)

As soon as the water begins steaming, ask: *What is coming out of the pan? What is making the water turn into steam?* (Heat of hot plate). *Where is the steam going?* (Disappearing into the air). *Let's put the lid on and see if we can catch some of the evaporating water. What is happening to the lid?* (Give every child the opportunity to see the condensation on the lid.) *It's water, isn't it. Where is that water coming from? Yes, it is coming from the water in the pan. Let's save the water that is forming on the lid and pour it into this paper cup.* (Do this several times until you have enough water to fill up the medicine dropper.)

Is the lid hotter or colder than the water in the pan? When we see the steam gathering into water on the lid, we say that it is condensing. (Write on board or have it written on a card.) *Let's say it together, Condensing.*

When you have gathered enough water to be tasted, choose about 3 or 4 children to test it. Give each of them about 3 or 4 drops from the medicine dropper without touching children's mouths. *Would you test our water and see if it is the same as the salty water we heated? Is it the same? What is different?* (There should be no salt taste.) *What happened to the salt? Maybe we had better test the water in the pan and see if the salt is still there.* (Choose another child to test the salty water. Make sure it is cool enough and won't burn!) *The water in the pan is still salty. Now why would the water on the lid not be salty and the water in the pan still be salty?* (Allow children to guess. Some may know why.)

Explain to the children that salt cannot evaporate like water can. You can demonstrate this by placing some salt in a dry pan and placing it on the hot plate. The salt will heat up, but not change its form.

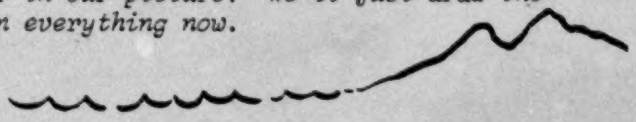
Discuss: *Where on our planet earth is there salt water? Yes, the oceans. We used the hot plate as a source of heat. What is the earth's source of heat?* (This may require a little discussion.) *What makes the days warm and plants grow? Yes, the sun. The sun is the earth's source of heat. Now, what does the sun or heat do to water? Do you remember that big word? Yes, it evaporates. Then, what does that evaporated water do if it cools down? It condenses, doesn't it. Condense means come back together. Just like when the balloon shrank back down after it was taken away from the heat.*

The steamy water that is all spread out in the air comes back together and forms what? Yes, water drops again.

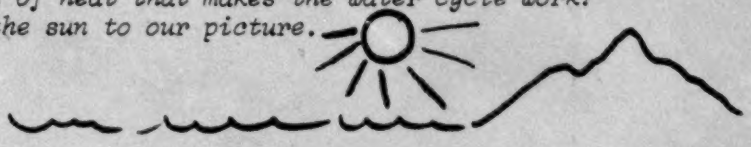
EVALUATIVE ACTIVITY:

Pass out 12x18 white construction paper to each child. This drawing will be of the water cycle. Teacher can draw on the board while students draw on paper. Discuss the water cycle as you go along. Everyone should draw the land, water, sun, clouds, and rain together. From there, the students can complete their pictures on their own.

Procedure: *So that we don't forget how our water cycle works, let's draw a picture of it. As we look at our globe, what are the two main things we see on our earth. Yes there is land and there is water. So let's put some land and some water in our picture. We'll just draw the lines first. Don't try to fill in everything now.*

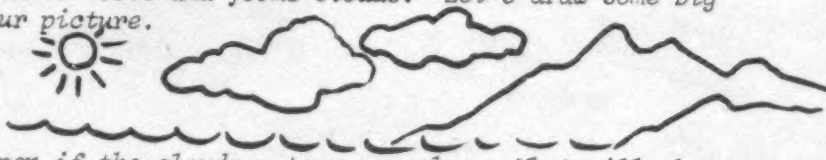


What is the earth's source of heat that makes the water cycle work? Yes, the sun. Let's add the sun to our picture.



What does the sun do to the water? Yes, it makes it evaporate. Where does all that evaporated water go? Yes, up into the air. What happens if the air gets colder? Yes, the evaporated water cools down. Do you think you can see cooled water up in the sky? Yes, that's what clouds are. What do we call a cloud that is sitting on the ground? Yes, fog.

So the evaporated water cools and forms clouds. Let's draw some big fluffy clouds in our picture.



Now, what will happen if the clouds get even cooler. What will the water do that is in the clouds? Yes, it turns into water drops and falls back to the earth. What do we call falling water from clouds? Yes, rain. Very good. That is what we call the Water Cycle. (Print on board.) *You may want to write that at the top of your picture. Now you may go ahead and fill in the rest of your picture.*

ADDITIONAL ACTIVITIES:

1. Show film Morning Mist

2. Read At Last to the Ocean, The Story of the Endless Cycle of Water. by Joel Rothman (Burien Library)

3. Read Hide and Seek Fog, by Alvin Tresselt and Roger Duvaisin

AT LAST TO THE OCEAN, The Story of the Endless Cycle of Water
by Joel Rothman (Burien Library)

Clouds begin to form.
High above the ocean clouds begin to form.
Darker and darker they grow as they float toward the mountain tops. Darker and darker.
Suddenly, as thunder booms, they burst.
Rain begins to fall. Over mountain tops, dark clouds burst, and rain begins to fall.
Water trickles down the mountains. Streams begin to form.
Over mountain tops, rain is falling, and streams begin to form.
Downward flow the streams, over leaves and over earth, over twigs, stones and rocks, through woods, fields and rolling hills.
Turning, twisting, streams of water rush to meet the river.
From clouds to rain to streams, to the river.
The river swells against its banks as it meanders across the countryside. It carries water.
Water for drinking, for swimming, for boating. Water to grow plants and flowers.
Water for power to run machines. Water - in all its beauty. Onward runs the river, flowing to the ocean.
From dark clouds --to rain--to streams--to the river--at last to the ocean.
The heat of the sun turns water into vapor. Water constantly evaporates, invisibly rising.
Clouds begin to form.
High above the ocean, clouds begin to form.

LESSON 8
Brine Shrimp

Taken from Elementary Science Study, Webster Division, McGraw-Hill Book Company

CONCEPTS: Living things originate in water.
Some living things require a complete water environment to survive.
Water environment, as any environment, must be carefully taken care of to sustain its life.

TIME: The introductory lesson takes about 1 hour and should be done early in the week to allow plenty of time for observation of hatching. Daily time within the next week and a half should be allowed for observation and discussion as the brine shrimp hatch and grow.

MATERIALS:
1 package or vial brine shrimp eggs
27 oz. marine salt (makes up 5 gallons of seawater)
NOTE: You do not need marine salt if it is mixed in with the eggs.
15 plastic containers
30 hand lenses
30 plastic spoons
30 sheets white paper (any size)
4 packages dried yeast
Natural salt water, or aged water (age H_2O at least 24 hours to remove chlorine content)
Worksheet #8 for each student

PROCEDURE: "The Little Brown Things"

Brine shrimp eggs usually come in small vials, each containing thousands of eggs. Do not tell the children what the brown things are. Pass out hand lenses, white paper, and then sprinkle a few eggs on the paper.

I'm giving you all something I would like you to look at carefully and study to see if you can guess what it is. When everyone has their materials, ask: *What do you think it is?* Some answers might be: coffee, dirt, pepper, chocolate, a chemical, a seed. *What does it look like? What shape are they?* (round) If children suggest that they should taste them, make sure that they taste only a small amount.

After the children have had a chance to investigate the "little brown things" with their hand lenses and to guess what they are, you may want to tell them they are eggs. On the other hand, you may want to pursue the mystery a little longer. If the children have suggested that the little brown things might be seeds, they could plant the "seeds". Do they grow? If you tell the class that they are eggs, there will still be many questions. What kind of eggs? How do we get them to hatch? Once the children know that they are eggs, encourage further questioning.

What kind of eggs do you suppose these are? What living thing would produce eggs like this? How big might the animal be?

Lead the discussion to bring in the fact that the size of an egg is related to the size of the animal that laid it. Later on, the children may ask how big their brine shrimp will grow. You can bring up the size of the eggs again.

Pass out marine salt if it is not already mixed in with the eggs.

What is this white stuff?

You may now want to explain to the children that the eggs will hatch if they are put in salt water. Since brine shrimp hatch in widely varying concentrations of salt - from 1 percent to 6 percent - you will find that some eggs hatch in solutions made from different "recipes". If each child uses about 1 tablespoon of salt in about a cup of water, most of the containers should soon have live brine shrimp in them.

The children should mark the level of water with a crayon so that they can refill it to the same level when the water evaporates. Pour water, then add salt, then eggs. (Just a pinch of eggs.) *We should all mark on our glasses where the water comes up to. Why should we do this? What is going to happen to the water? What happens to water if it just sits out?* (From lesson on evaporation) *Does salt evaporate?* (salt does not evaporate)

How many of you have ever made Tang or Koolaid? What happened if you did not add enough water? (Too strong, didn't taste right.) *What happened if you added too much water?* (too weak, didn't taste good at all.)

Now, what would happen to the brine shrimp if we let the water evaporate, but did not add any more? (The water would be more salty). *Do you think the brine shrimp would like this? No, just as we like our tang made correctly, the brine shrimp likes his water to be just right. What do you suppose might happen to the brine shrimp if his water got too salty?* (Too much salt would kill the brine shrimp.)

What do the eggs do when you put them in the water? Sink or float? Pass out ditto for pictorial record of growth. *This will be a growth chart for our brine shrimp. Each day we will have a special time for you to look carefully at your brine shrimp and draw a picture of how he looks.* (Ditto covers 2 weeks, but given another sheet, the child may extend his time of recorded observation.) Make sure there is plenty of time during the next two days to check the eggs frequently. Plastic spoons will be useful for sampling. If the children are careful not to let the water in the spoons evaporate, they will be able to return the brine shrimp safely to the containers. You should not worry if some of the brine shrimp die. It is far more important for the children to handle the animals freely than for all the brine shrimp to survive. NOTE: Although it is fun for each child to have his own individual cup of brine shrimp, you may wish to change them to an aquarium after the first day or two. This would avoid many spills and you can keep track of salt and water content more easily.

The newly-hatched brine shrimp will be very small and pale, and will be difficult to see. It may help to hold a container up to the light and look through one side. Hand lenses help. If a microscope is available, the children may be able to see changes in the eggs, and the "oozing" that takes place about about 24 hours, as the eggs begin to hatch. NOTE: Adding food coloring to the water a few days after the brine shrimp have hatched makes them easier to see.

About 2 days after starting the brine shrimp in water, is a good time to set up a bulletin board for questions about the animals and whatever answers the children come up with. (The children should be making their pictorial record of the growth of the brine shrimp, using Worksheet #8.)

Questions you may ask or place on the bulletin board to stimulate closer observation:

Can you see legs?
Do they swim or float?
Do they stay together?
Do they ever bump into each other?
Do they like one side of the container better than another?
Do they stay near the bottom more than near the top?
Are all the eggs hatched?
Can you tell a "SHELL" from an egg that is not hatched?
If we leave the unhatched eggs in, do you think they will hatch?

The children will probably begin to ask their own questions and want to add them to the bulletin board or discuss them in the class. Examples:

What do we feed them?
Are they alive?
Can they see?
Will they grow bigger?
Can we count them?

Feeding brine shrimp: Feeding is not necessary if tiny green threads of algae start to grow in the containers. If you want to add foods, powdered, dried yeast (available at most grocery stores in small alimunum foil packets) will do very well, but the children must be very careful not to overfeed. A general rule is to feed no more than disappears and leaves the water crystal-clear in two days. One or twice weekly feedings are enough.

It may be useful to try to get across the idea of how little food brine shrimp need by comparing the appetite and size of the children with that of the brine shrimp. Even a very hungry child couldn't eat a plate of spaghetti as big as he is. The brine shrimp aren't much bigger than a crumb of yeast, so just a tiny bit will be enough.

EXTRA ACTIVITIES:

1. Continue observations of growth, observe male and female, newly hatched eggs from grown females.
2. Bring in a fresh whole shrimp from the fish market, and compare with brine shrimp.
3. Experiment with what conditions the brine shrimp can live in. Examples: Set up single containers of water, and add amounts of salt differing from that originally suggested.

   Try changing temperature of H_2O, amount of eggs, lightness or darkness, etc.

4. Show film Brine Shrimp, 16mm, silent, color. Webster Division of McGraw-Hill Book Co.

5. Read Mabel, The Whale on last page of this lesson. Discuss the needs of living things that live in water.

   Discuss responsibility for pets, occupations that can help with unusual tasks, proper facilities for keeping animals for observation. Ask: *Do you think Mabel should have been caught? Would you want to catch Mabel? How would you do it?* (Problem solving discussion). This could also be a creative writing activity. Ask: *What do whales eat? Why do they blow?* This could also be a creative writing activity or a stimulus for individual reports on whales.

6. See ESS Unit on Brine Shrimp for more ideas depending on the time you have.

BRINE SHRIMP GROWTH WORKSHEET #8A	Day 1	2	3
4	5	6	7
8	9	10	11
12	13	14	15

BRINE SHRIMP GROWTH

WORKSHEET #8B

	ALIVE ☐ NOT HATCHED ☐ DAY 1	ALIVE ☐ NOT HATCHED ☐ 2	ALIVE ☐ NOT HATCHED ☐ 3
ALIVE ☐ NOT HATCHED ☐ 4	ALIVE ☐ NOT HATCHED ☐ 5	ALIVE ☐ NOT HATCHED ☐ 6	ALIVE ☐ NOT HATCHED ☐ 7
ALIVE ☐ NOT HATCHED ☐ 8	ALIVE ☐ NOT HATCHED ☐ 9	ALIVE ☐ NOT HATCHED ☐ 10	ALIVE ☐ NOT HATCHED ☐ 11
ALIVE ☐ NOT HATCHED ☐ 12	ALIVE ☐ NOT HATCHED ☐ 13	ALIVE ☐ NOT HATCHED ☐ 14	ALIVE ☐ NOT HATCHED ☐ 15

MABEL THE WHALE by Patricia King, Follett Pub. Co., Chicago 1958, (Burien Library)

Mabel was a whale. She lived in the Pacific Ocean. The water was very deep. The water was very blue. Mabel was a happy whale. She lived with her cousins. They swam in the deep blue ocean. One day some men came. They came in a ship. The men caught Mabel. They did not hurt her. They put Mabel in the ship. Then the men took Mabel away from the deep blue ocean. They took her to live in a place called Marineland. In Marineland fish and sea animals live in big pools or tanks. People come to see all the fish and sea animals. Mabel was put into a tank. The tank was small. The water was not deep or blue. The water was not deep at all. Mabel could not hide in it.

The sun shone down. It was very hot. Mabel could not hide her top fin under the water. So the hot sun burned Mabel's fin. People came to see Mabel. They looked at her through the glass. The people liked Mabel. But Mabel did not like the tank. She did not like the water. The water was not deep. Mabel could not hide her top fin under the water. Mabel was very unhappy, and she was very sad. Her fin hurt. She lay on the bottom of the tank, but she could not hide her fin. The sun still burned it. Soon Mabel was very sick.

The doctor came to see Mabel. He looked at her from head to tail. The doctor saw the sunburned fin. He knew that fin hurt Mabel. Then the doctor told the men at Marineland how to help Mabel. The men put a cool cream on her fin. The cool cream was for sunburn. Then the men put an old bag over the fin. The sun could not burn through the bag. It could not hurt the fin now. But Mabel did not feel any better. She was still a very unhappy whale. She even stopped eating. Mabel was very sad. Everyone wanted to help her. They thought and thought. What could they do? Then the men at Marineland had an idea. There was a very big round tank in Marineland. If they moved Mabel to the big tank, she would have more water. How could they move Mabel? It would not be easy. The men thought and thought. At last the men brought a big, big crane. Then they brought many mattresses. Then they brought a raft. They put the mattresses on the raft. They put Mabel on the mattresses. Then the men lifted the raft, the mattresses, and Mabel with the big, big crane. They put the raft, the mattresses, and Mabel on a big truck. The truck moved Mabel to the big tank. Then Mabel was lifted fifty feet up into the air with the crane. She was put into her new big tank.

Then the doctor gave Mabel some shots. They were whale-sized shots. The shots kept Mabel quiet until she got used to her new tank. The shots made Mabel feel better. Then a man walked Mabel around and around in her new tank. He walked her around the tank so she would get to know it. Soon Mabel felt better. She swam around in her new tank. The water was deep. The water covered Mabel's fin. The sun did not shine on the fin and burn it. Mabel was happy. Before long, Mabel blew! It was a happy spray. Mabel was a happy whale. Everyone at Marineland was happy because Mabel was well again.

LESSON 9
Water Pollution

CONCEPTS: Clean water is important to living things.
Man's activities affect resources.
Littering can cause pollution.

TIME: 45 minutes

MATERIALS:
2 white or light colored pipecleaners
jar of clean water
jar filled with dirty, greasy water (sweepings from the floor plus a little oil from the custodian's grease can.)
pictures of polluted and clean water scenes
30 paper lunch bags
scissors
paste
crayons
Neaterbug badge ditto
Dragon ditto

PROCEDURE: Hold up the glass of clear water and ask: *What do you think this is?* (clear water) Hold up the glass of dirty water and ask: *What do you think this is?* (dirty water) *Which glass of water would you like to drink?*

There is a word for dirty water. Does anyone know what we call dirty water? We say it is polluted. Raise your hand if you have heard that word before. Who can explain what it means? (Water is said to be polluted when it contains something unwanted in it.)

Is muddy water polluted? What is in muddy water? (Guide discussion to bring out the fact that rivers do distribute soil nutrients that help plants to grow.) *Is there any polluted water near you?* (Let children tell about polluted water they may have seen..)

Which glass of water is polluted? (Have labels ready to place in front of the glasses of water.) Let a child place the correct labels in front of the glasses of water.

Next have a child insert a clean pipe cleaner into the glass of clean water. Have another child dip a pipe cleaner into the polluted water. Pass around the pipecleaners and let the children observe and compare them. Also let the children smell the two containers of water and compare.

As they are doing this, ask: *Which kind of water would you like to play and swim in? Why?* (Allow for several responses.)

We don't like polluted water. What else might not like polluted water? If the children don't think of animals and plants, ask: *What living things make their homes in water?* (plants, fish) *Do you think that fish and plants could live healthy lives in the greasy, dirty water?* (Explain that there must be air present in water for plants and animals to live; and that trash and grease use up the air.) *How does water get polluted?* Open response, and bring out the pollution pictures to show. (Some examples might be: polluted stream showing dead fish, clear stream of water, people fishing in a well-managed farm pond, water recreation, a street cleaner.)

Ask the children to select the pictures showing water pollution. Discuss how they might have gotten that way. Bring up the fact that every time we use water, we return it dirty, and that makes it harder to use the next time.

Discuss the clean water pictures and what is good and beautiful in each.

What could each of us do to help out in the fight against water pollution? How would dirty, trash streets pollute our streams? (Rain water can wash the litter into the streams.) *Remember from our lesson on dissolving that water can carry things and dissolve things. What could we do right around our school and homes?* (Open response) Some possibilities might be:

1. Use trash cans for all our trash.
2. Remind others to use trash cans.
3. Pick up toys and clothes at home.
4. Take turns being the trashman in the schoolroom.
5. Empty vases of dead flowers.
6. Keep desks clean.
7. Never throw litter out of cars.
8. Keep a litterbag in the family automobile and use it.
9. When camping, don't dump garbage.
10. Don't wash clothes in streams or lakes.

Today I'm going to give each of you something very important to make to help out in the fight against pollution. Can you guess what it might be? Yes, a litterbag. What do we call a person who litters? Yes, a litterbug. We are not going to be litterbugs. Can you guess what a person might be called who helps clean up the environment? A Neaterbug!

Pass out the paper bags and Neaterbug badge ditto to each child. Instruct the children to color and then cut out the Neaterbug badge and the Neaterbug bag emblem. The Neaterbug bag emblem should be pasted on the paper bag. Pin the Neaterbug Badge on each child just before they go home. *On your way home, you can use this Neaterbug bag to collect litter than might pollute our streams and ponds.* (Remember to set aside a time the next morning to discuss how everyone was a Neaterbug.)

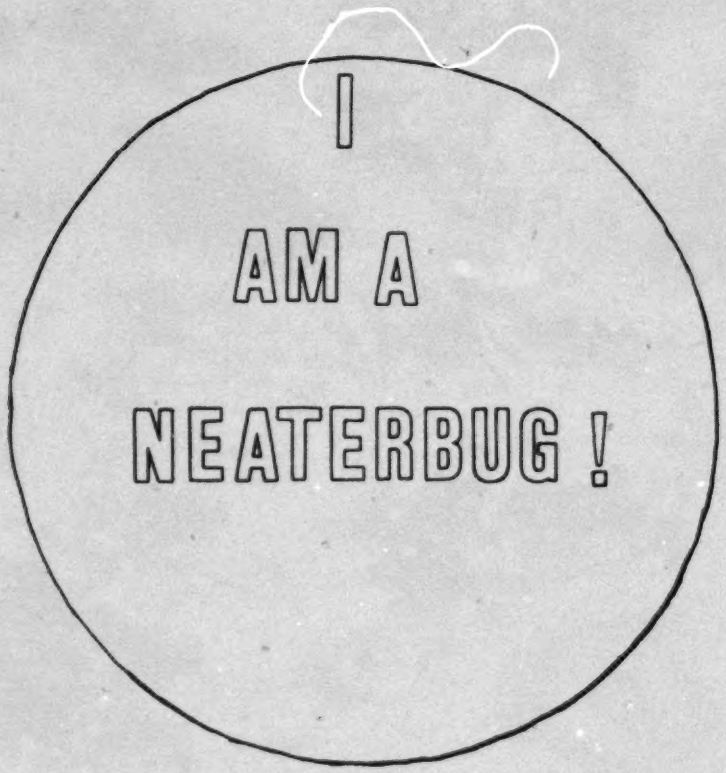
ADDITIONAL ACTIVITIES:

1. Film: "Uncle Smiley Goes to the Beach"
2. Children can color Dragon ditto.
3. Play Litterbug game: Children form a circle, choose two people to play parts of litterbug and neaterbug, and sing this jingle to the tune of "Did You Ever See a Lassie?"

Oh, here comes a litterbug, a litterbug, a litterbug,
Oh, here comes a litterbug
Just see what he'll do.
(Litterbug scatters paper within the circle.)
I don't want to be a litterbug, a litterbug, a litterbug,
I don't want to be a litterbug
And neither do you.

Oh, here comes a neaterbug, a neaterbug, a neaterbug
Oh, here comes a neaterbug, Just see what she'll do.
(Neaterbug picks up trash and puts it in litterbag or trashcan.)
Oh, I want to be a neaterbug, a neaterbug, a neaterbug
Oh, I want to be a neaterbug and so do YOU!

4. Children can draw their own pictures of what they think a Neaterbug looks like.
5. Vocabulary for Water Words Chart: pollution.
6. Clean up school yard.
7. Discuss water safety rules.
8. Make your own filters by filling ½ gallon milk cartons with alternating layers of sand and pebbles (about 2-3 inches deep) then punch holes in the bottom of the carton. Pour dirty water through the carton one or more times to purify it. You can use the water from previous water color painting activities, or any dirty water.
9. Read <u>There Lived a Wicked Dragon</u>, U.S. Environmental Protection Agency.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AM A
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NEATERBUG
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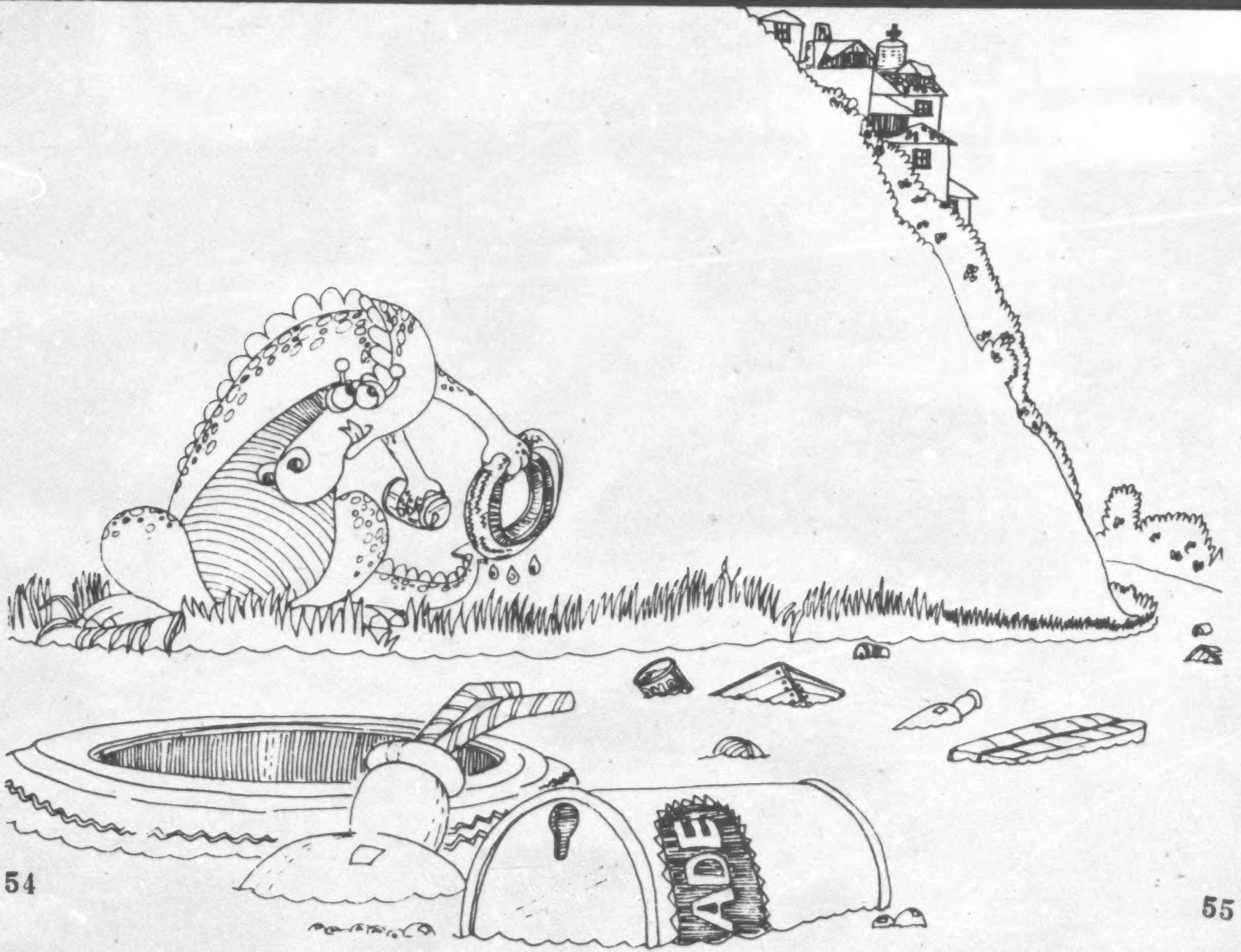

ADE

There Lived a Wicked Dragon

Martha Finan
U.S. Environmental Protection Agency - 1973

Once upon a time in a not-so-far-away kingdom there lived a wicked dragon. For many years this dragon dwelled quietly in his cave at the bottom of a hill, dozing and snacking a lot, and growing a little -- ever so little -- each year.

While he dozed, the grownups in the kingdom worked and played, racing one another home on Fridays and taking their paper plates and cups on picnics in the park.

The wind caught the paper plates and cups and tossed them down the hill where the dragon snatched them with his hungry green jaws. Then -- alack! alas! -- the dragon grew a little, ever so little.

And the children gathered tiny violets in the woods.

Some days the dragon paced restlessly in his cave. His pacing wore a path in the moss, frightening small animals who scurried out of the valley toward the village. "Hark!" said one of the grownups, tapping her heels on the sidewalk and staring hard at an animal. But nobody else noticed anything furry. The grownups kept on working and playing, driving their cars home from the office and driving them to the zoo on Saturdays.

The fumes from the gasoline oozed through the tailpipes and settled over the valley where the dragon lived. The dragon squinted his bulging green eyes until he finally fell asleep. While he slept -- alack! alas! -- the dragon grew a little, ever so little.

And the children wove prickly baskets out of cockleburs.

One day the dragon snorted in his sleep. His snort stirred the air and raised the sulphur dust outside his cave, sending a gust of hot air up the hill toward the village.

"Hark!" said one of the grownups, wriggling his nose and sneezing. But nobody else noticed anything stinky. The grownups kept on working and playing, stuffing black rubber tires into factory furnaces and throwing their beer cans and soda bottles into the river.

The beer cans and soda bottles floated with the current to the bottom of the hill. The dragon gnashed them with his long sharp teeth. Then -- alack! alas! -- the dragon grew a little, ever so little.

And the children nibbled the timothy stems that tasted sweetly of milk.

Again one night the dragon stirred, this time rolling over in his sleep. He caused a tremendous rumble, loosening dirt and cinders that rose in a whirlwind toward the village.

"Hark!" said one of the grownups, rubbing his eyes that smarted from the dirt and turning to his wife for sympathy. But nobody else noticed anything dirty. The rest of the grownups kept on working and playing, spraying bug killer that crept into the orchard ponds and spreading fertilizer on their lawns.

The fertilizer mixed with the rain that trickled into the river. The dragon gulped the river water with his rough red tongue. Then -- alack! alas! -- the dragon grew a little, ever so little.

And the children stroked an orange butterfly in the lazy sun.

One night the dragon opened one eye, one cold green eye, and yawned. The yawn created a terrific noise, thundering up the hill and over the roofs of the village.

"Hark!" said one of the grownups, holding his ears that throbbed from the noise. But nobody else noticed anything loud. The grownups kept on working and playing, throwing tons of paper into the wastebasket and flying in airplanes to the beach.

The planes' thick smoke mixed with the clouds that sifted soot into the river. The dragon melted the soot with his hot smelly breath and slurped it into his mouth. Then -- alack! alas! -- the dragon grew a little, ever so little.

And the children counted seven stars in a yellow dipper.

Suddenly, at the bottom of the hill, the dragon roared. He shook his wet scales. He stretched his ugly tail. Then slowly, heavily, he started uphill toward the village. "Look!" shouted the grownups, all together. "Here comes a dragon up the hill! He is very big, big enough to gobble us up! We must do something." The grownups did not work. They did not play. They huddled together and thought, and thought, and thought.

Early next day, before the morning-glory had opened to the sun, a line of white trucks rumbled along the main street of the village. Into the first truck the grownups piled the beer cans, the beanut butter lids: all the metal they could find. Into the second truck they piled the Sunday paper and the picnic plates that blew around the park. Into another truck they loaded soda bottles and jelly jars, and the tiny containers that held the babies' food. Into the last truck went black rubber tires, and corn cobs and chicken bones left from Saturday's supper.

Then the grownups hauled away the truckloads of hard things, solid things that made the world so dirty. They stopped the white trucks at a new machine the men had built outside the village. The machine squashed the old beer cans and melted the metal to make new ones. It mashed up the picnic plates, the tons and tons of Sunday papers, to make fresh paper all over again. It crushed the soda bottles into tiny pieces to make shingles for the houses in the village.

And the children's eyes grew wide in wonder.

Some grownups loaded more old tires onto a train that chugged its way over the hill to the ocean. There they piled the tires into a reef where the fish could live.

Other grownups burned some of the trash that could not be used for anything else. They made steam that heated the houses of the village on nippy mornings.

And the children held out their hands to the warmth.

A few grownups strained the bug spray from the orchard ponds and the fertilizer from the river.

They moved some of their cars off the street to make room for the bus to take them to the office. Other grownups grounded the airplane with its gray smoke so they could fit it with a filter to keep the sky clean.

Finally it was time to cover the last of the trash, the things that nobody could use again and nobody could burn. The grownups buried those solid wastes in layers underground. Over each layer they spread dirt, loads and loads of brown dirt.

On the top layer they planted green grass and willow trees. They made a playground with swings that swung as high as the sky.

And the children ran barefoot through the grass.

Late that night all the grownups came home. Their hands had blisters. Their hair was mussed. Their faces were sunburned. Their fingernails were dirty. But they were smiling.

When the round yellow moon came up over the kingdom all the people of the village had gathered at the edge of the hill.

"Listen to the croak of the bullfrog!" they shouted, all together. "Smell the smell of the watercress! See the sparkle of the moonlight on the water!"

It was true -- in the village all the good things had come back to the river: the croak of the bullfrog, the smell of the watercress, the sparkle of the moonlight on the water.

Since that night none of the grownups have seen hide nor scale of the hungry dragon in that kingdom not so far away from here.

Only the children know where he lives.

LESSON 10
Water Conservation

CONCEPTS: There is a limited supply of water for the whole world to use. Each person is responsible to help preserve that supply of clean water and not waste it.

TIME: 40 minutes

MATERIALS:
Book THE KING'S FOUNTAIN, by Lloyd Alexander, 1971, E. P. Dutton & Co., Inc. (Burien Library)
1 sheet of ¼" graph paper for each child, and 1 sheet for the room
2 tagboard charts, one entitled "How Water is Wasted", the other "How We Can Save Water"
Felt pen
Conservationist Badge ditto for each child (15 copies on white construction paper, then cut in half)
Copies of worksheet #9 for each student

PROCEDURE:
Read story.
Afterwards, ask these questions:
What was the poor man so concerned about?
Do you think he was right to be concerned?
How do you feel about the king? What kind of a man was he?
What was going to happen if he built the fountain?
How much water did the people have? (Only the stream)
Why did the people in the village need water? (to drink, for animals, crops)
Do we need water, the same as they do? Yes, of course.
Does anyone today ever do anything to take away or use up part of our fresh, clean water supply? (open response)
What is that kind of a person who doesn't care where he throws his trash and garbage? Yes, a litterbug.
How does litter spoil our fresh, clean water? (Washes into the water and makes it dirty.)
Whose responsibility is it to help keep the water clean? (Water Department and US)
How much water in the world is there?
Where does our water come from? (Rain. There is only as much water as there is rain and snow.)
What if we had to put a nickel in every time we took a drink of water?

Bring out chart "How Water is Wasted". *What are some of the ways that water is wasted?* (Write down suggestions on chart "How Water is Wasted".

Bring out chart "How We Can Save Water". *Let's think of some ways that we can help save water around here at school and at home.* (As suggestions are made, write them down on the chart.) Some possibilities:

1. Don't waste water at drinking fountain
2. Fix leaky faucets
3. Shower instead of bath
4. Turn water off when brushing teeth
5. Put litter in garbage can only
6. Don't leave water running when you don't need to
7. Remind others not to throw garbage in streams
8. Keep a litter bag in family car and use it
9. Pick up toys and clothes at home
10. Remind others to use trash cans

Put up both charts for class to see as you are writing.

How many times a day do you think all of us in this room turn on a water faucet in one day? (Let children guess)

Let's see if we can find out. I'll put up this graph paper, and each time each of us uses some water, we can put an X in the box.

Also, you may each take this checklist home to keep track of how many times you use water. Send home worksheet #9, checklist of water use for children to keep track of how, when and where they and their families use water. Have them bring the lists back and discuss when they used the most water, etc. (Be sure to set aside time the next morning to add up everyone's marks, and discuss how many actual times the class used water.)

Part II (Next Day)

CONCEPTS: Same

MATERIALS: Ditto of suggestions that the children gave on how we can save water.
Conservationist Pledge: "I give my pledge as an American to save and faithfully defend from waste the natural resources of my country - its soil and minerals, its forests, waters and wildlife."
Scissors
Crayons
Conservationist Badge (make copies on white construction paper)

PROCEDURE: Instruct each child to cut out his badge, and decorate it with crayons any way he chooses.

Teach the children the Conservation Pledge in any method you choose - writing, reading, orally. Talk about what it means.

Send home the list of suggestions the class made for each child to share with his family.

Pin the badges on the children and ask them to wear their badges for three days, and then report back to the class something they did to earn the title conservationist. You might want to put the badges on yarn for easier wearing, and taking off and on.

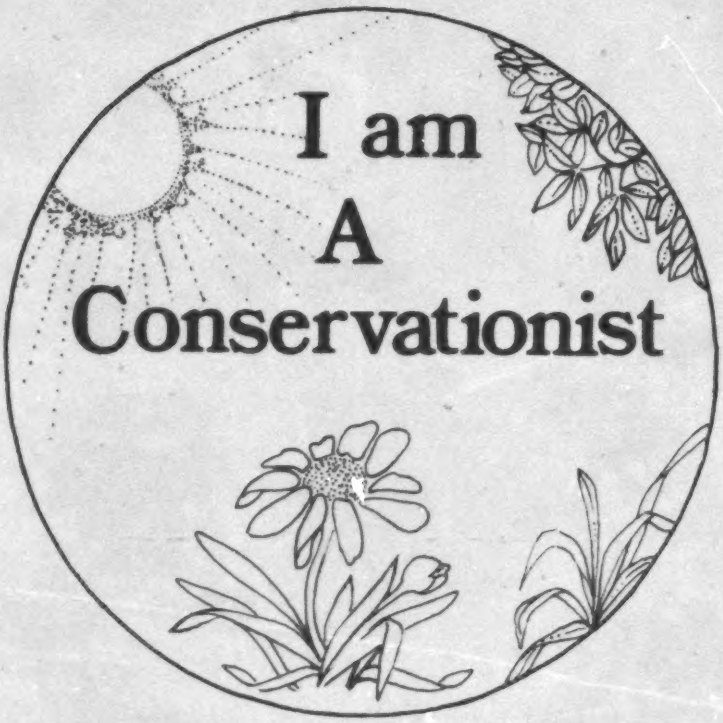
CULMINATING ACTIVITIES:

1. Vocabulary for Water Words Chart: fountain, faucet, conservation
2. Make a meal with water: for example have tang, soup, jello.
3. As a class, in small groups, or as individuals, go over all the water on the chart that was made throughout the unit.
4. Make up an extra supply of Conservationist badges. Then tell the class that there are extra badges so that if they, as Conservationists, discover other people who are doing something to "save our resources" they can share with the class what they observed and award that person a Conservationist badge. (This builds an awareness of what other people are doing, and that it is the responsibility of everyone to be a conservationist.)

4. You might want to have the children write about what they have learned about water and make a class book and listening tape if desired. This could be independent writing, or it could be done as a group chart activity.

Example:
1. Water is important to us.
2. All living things need water.
3. We get our water from the weather, such as rain and snow.
4. Water can freeze hard into ice.
5. We use ice and snow for fun and keeping food.
6. Water may look clean, but really not be good to drink or use.
7. Living things need clean water to live healthy lives.
8. When water evaporates, it goes into the air.
9. Heat and wind can make water evaporate faster.
10. When water in the air gets colder, it comes back together to make water drops.
11. The water cycle gives us our rain and snow.
12. Brine shrimp need just the right kind of water to live in.
13. Clean water is important to us.
14. We all need to help save and not waste water.

(You might want to review just a couple of concepts a day and use the sentences for a writing assignment.)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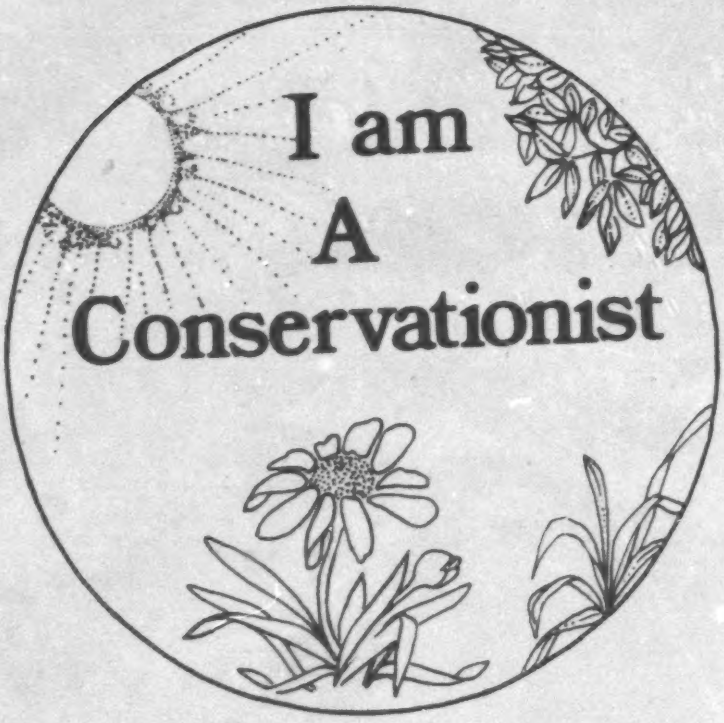
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WORKSHEET #9

NAME _____

CHECKLIST FOR WATER USE: TAKE THIS HOME. EACH TIME YOUR FAMILY USES SOME WATER, PUT AN X TO SHOW WHERE YOU USED IT.

1. WASH HANDS										
2. COOKING										
3. BATH										
4. SHOWER										
5. BATHROOM										
6. WATER PLANTS AND YARD										
7. WASHING CLOTHES										
8. WASHING DISHES										
9. DRINKING										

THE KING'S FOUNTAIN by Lloyd Alexander, 1971, E.P. Dutton & Co., Inc., New York

A king once planned to build a magnificent fountain in his palace gardens, for the splendor of his kingdom and the glory of his name.

This fountain, however, would stop all water from flowing to the city below.

A poor man heard of it, and said to his wife: "Soon our children will cry for water, our animals will sicken, and all of us will die of thirst."

His wife answered: "A man of highest learning must go to the King, speak to him out of wisdom, and show him the folly of his plan." So the poor man went throughout the city, to the most learned of scholars, and begged him to plead the cause.

But the scholar, deep in his own grand thoughts, barely listened. He pondered lofty matters and had no interest in humbler ones. And the scholar lectured him with so many cloudy words that the poor man could make no sense of them at all, and went away downcast, saying to himself: "Alas, the grandest thought quenches no thirst. Besides, what good is all the learning in the world if there is no one who can understand it?"

He realized that someone must present the cause clearly and winningly, with a golden tongue, so the King would listen and agree.

So he went to the market place, to the merchants whose words were smooth as pearls and who could string them together endlessly. But when these merchants heard what he wanted, they choked with fear and their glib words failed them. While they gladly offered clever advice, not one dared face the King. The poor man left them and went away dismayed, saying to himself: "Alas, the finest words are empty air without the deeds to fill them. Besides, what good is a golden tongue without a brave heart?"

Then he realized that a man of strength and courage must go and force the King to change his plan.

Again he went throughout the city, to the strongest of all brave men: a fearless metalsmith who could knot an iron bar as easily as a shoestring. The metalsmith, eager to stand against the King, swore that once inside the palace he would smash every window, crack every wall, and break the King's throne into firewood.

The poor man sadly shook his head, knowing the palace guards would strike down the rash metalsmith before he did even one of those deeds. And the King in his wrath would be all the more determined to build his fountain. So, leaving the metalsmith still pounding his fists, he went away in despair, saying to himself: "Alas, the strongest hand is useless without a wise head to guide it. Besides, what good is all the bravery in the world if it serves no purpose?"

He trudged home, hopeless and heavy-hearted, and told his neighbors and his family that he could find no one to stop the building of the fountain. His daughter spoke then, and said: "But Father - why not go yourself?"

Confused, unable to answer, the poor man looked at the faces of his wife and family. At last, he bowed his head and murmured: "I hear my own flesh and blood. Indeed, there is no one else, and I myself must go to the King."

The poor man left his home. Alone, he slowly climbed the steep and seemingly endless hill. Finally, he reached the King's high palace and for a long while stood outside, fearful and hesitant. When the palace guards roughly seized him and threatened his life

for intruding, the poor man trembled in such terror he could scarcely speak. Desparately he blurted out that he had an important message for the King alone.

The guards marched him to the throne room, where the King angrily demanded why he had come. Knees knocking, teeth chattering, the poor man began to tell as well as he could of the suffering that the fountain would cause.

"Enough!" roared the King. "How dare you question what I do? I am the King!" The poor man wished for the smallest crumb of the scholar's learning, but he could only stammer: "Majesty - thirst is thirst, a poor man's no less that a king's." Then his tongue dried in his mouth and he wished for even one of the merchants' golden words.

The King looked scornfully at him. "You come to trouble me for that? I need only snap my fingers and my swordsmen will cut you to pieces and be done with you."

The poor man wished for one drop of the metalsmith's bravery. With his own last ounce of courage, he answered: "You have the power to kill me. But that changes nothing. Your people will still die of thirst. Remember them each time you see your splendid fountain."

The King started up, ready to call his guards. But he stopped and fell silent for a time, his frowns deep as his thoughts. Then he replied: "You are too simple for clever debate with me; but you have a wiser head than a scholar. Your speech is halting; but there is more true eloquence in your words than in the golden tongue of a cunning counselor. You are too weak to crack a flea; but you have a braver heart than anyone in my kingdom. I will do as you ask."

The poor man returned to the city and told the news to all. The scholar wrote a long account of the matter in one of his books, and misplaced it. The merchants never stopped ornamenting tales of the poor man's deed. The metalsmith was so excited he tossed his anvil into the air and broke one of his own windows.

The poor man, glad simply to be home with his rejoicing family, was hardly able to believe what he had done. "A wise head? A golden tongue? A brave heart?" he said to himself. "Well, no matter. At least none of us will go thirsty."

Discuss: personal responsibility and people discovering in themselves resources they never suspected; how each of us is important in helping to conserve and protect our water supply.